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Weekly Newspaper

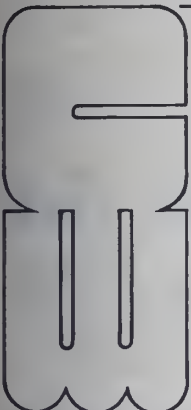
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NEWS
IN
BRIEF

IBM 370 Lease Has No Overtime Charges

WHITE PLAINS, N.Y.—IBM has announced a 48-month term lease plan—with no overtime charges—in addition to standard lease and purchase plans now being offered.

The plan covers the virtual storage central processors of System 370 models 125, 135, 145, 158 and 168 and their associated multisystem units, channels, consoles, power and coolant units.

The monthly charge under the term lease plan is the same as the standard monthly lease charge for these machines, but the machines can be used for an unlimited amount of time at no additional monthly charge, the firm said.

IBM said the new plan will benefit customers with high utilization of data processing equipment. Users of teleprocessing and data base data communications systems will now be able to run their applications round-the-clock at no added rental cost.

The term lease plan is being announced for the U.S. and Canada.

Hawaii to Double-Check Election Results Programs

HONOLULU — Who checks the election results here? The same program that produced them in the first place. A loophole in auditing? Yes, and according to Gerald L. Mann Jr., director of the city's Department of Information Systems, it's one quite common in other cities he's contacted.

But a legislative bill being proposed here promises to end nightmares of undetected program errors.

Currently, election results are processed by an outside computer service. The only audit made on the outside program is to rerun data from selected precincts using the same program and computer.

If the state legislature approves the proposal, the city will write its own Cobol election results program which will be run using selected precincts to check on the outside firm's program. The program will also be run on a different computer.

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Rating High on CAI

Students in the "Model Schools for Model Cities" program in Los Angeles have their own terminals to converse with a time-sharing system. The students averaged a gain of 1.4 years in mathematical reasoning ability after the first four months of using computer-assisted instruction, school officials said. Story on Page 3.

'Packaged' B700s Have S/3-Like RPG, Key Entry

By Don Leavitt
Of the CW Staff

DETROIT — Burroughs has filled the gap in its small computer series with two B700 systems. Introduced here last week the B700s have from 32K to 48K bytes of core and fall between the already available L8000 Series minicomputers and the B1700.

Described as a "perfectly valid" alternative to the smaller IBM System/3, the B700 combines some of the design concepts of the B1700 with an ease of operation Burroughs feels is necessary for the less sophisticated user.

The B700s provide operator communications with the system through the direct entry keyboard similar to that on bookkeeping machines. Other media, however — disk, tape, cassettes, paper tape and punch cards — are available for large-scale jobs.

RPG Like S/3's

RPG, similar to IBM RPG II, and Cobol are available as languages, but

Burroughs has developed and is stressing a series of business management systems (BMS), packaged programs for specific businesses, for those users with no in-house programming capabilities.

In the B700's microprogrammed processors, hardwired logic is replaced by interpreter micro instructions. A new feature called Dynamic Interpreter Configuration, which is controlled by the BMS programs, is said to optimize the efficiency of the interpreter micro instructions so that main memory is allocated only to those resources needed for a given program.

This results in the largest possible area of memory made available to the user programs and increases system throughput, the firm said.

The interpreter also contains the System Control Program, which monitors and directs systems activities. It includes an interrupt system, an imbedded I/O manager, and all the "soft" controllers for the I/O processors.

Since most of the functions of the usual I/O controller are performed by software, Burroughs explained, the principal task of the hardware device is to translate from the I/O media's code to Ascii code which is the internal machine code, and vice-versa.

(Continued on Page 3)

Money Men Reappraise 360, Find \$ Value Zero in 1978

Special to Computerworld

NEW YORK — Peat, Marwick, Mitchell & Co., a major auditing firm employed by several large third-party leasing firms, has reappraised its policies on residual values of System 360s and related peripheral equipment, according to its Management Information Letter 1973.3.

The letter, signed by J.P. Cummings, said that third-party computer leasing companies must reduce the asset value of 360 equipment and peripherals to zero not later than Dec. 31, 1978. At the same time, the value of all enhancements should also be totally recovered, the letter noted.

The firm recommended as an intermediate step that 360 values after Dec. 31, 1975, should be carried at no more than 15% to 25% of the original cost.

In addition, the leasing companies are asked to consider their customer base, marketing capability, the terms of leases and the accuracy of the company's financial forecasts. To adopt a maximum undepreciated cost of 25% by Dec. 31, 1975, a company must be strong in each of these items, according to the auditing firm.

Peat, Marwick, Mitchell & Co. includes Ite Corp., Computer Investments Group, Data Processing Financial & General and Rockwood Corp. among its clients.

Users Not Directly Involved

The evaluation guidelines in the management letter need not necessarily apply to users of purchased equipment. The utility of the equipment does not change, and if the user has a known workload so that he will not be remarketing the equipment, there need be no direct impact on his evaluation of the equipment.

One of the curiosities of the report is that enhancement programs, which have been developing the power of the 360, appear to be regarded as a contributory cause of the change in policy, apparently considered as a liability rather than an asset.

The auditing firm commented that some lessors have been compelled to step up their enhancement programs by installing technologically advanced peripheral equipment to make the systems more

attractive to new or old lessees, and that this involves the problem of remarketing the peripherals replaced.

Apparently based upon this deduction the firm said peripherals which enhance the system should be assigned a maximum useful life of five years, provided it is neither beyond 1978, nor beyond the remaining useful life of the system to which it is connected.

The policy regarding 360 enhancements which do not consist of peripherals, or which do not cause replacement of other owned equipment — such as the CHCS Model 30 Accelerator, or the over IBM limit add-on core systems — appears not to be directly covered in the statement.

However, it would appear that any attempt by a Peat, Marwick client to get its approval for such enhancements retaining value beyond 1978 would have to be very well-documented.

Peat, Marwick, which has previously been approving straight-line depreciations

(Continued on Page 2)

Private Line Charges

Bell Asks Rate Revision

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. — AT&T has asked the Federal Communications Commission for approval to revise its private line rates to compete with the specialized common carriers. The rates would affect more than 19,000 private line users.

Under the proposal Bell would set up a

Can Bell cost-justify its proposed changes? Story on Page 21.

two-level rate structure based on high-density and low-density routes. For users along high-density routes, monthly rates would drop from \$3/mile to 85 cent/mile, while rates in low-density areas would be increased.

Bell defines high-density areas as geographic centers where it has the facilities to terminate 1,200 or more voice channels from its L-carrier transmission

routes. These 382 high-density centers in many cases coincide with the areas where the specialized carriers such as Microwave Communications Inc. plan to provide service. All others would be classified as low-density centers.

The high- and low-density rates would apply to interstate voice-grade private line services of more than 25 miles. On smaller "short-haul" links AT&T proposes higher rates based on several phased increases.

How Dense?

While the exact effect of the proposed rate restructuring will depend on the density classification of the user's routes, some of the increases will be tied to higher end termination charges. Current private line users pay a service terminal charge at each end of their links. This charge is now \$10/mo for "foreign" ex-

(Continued on Page 2)

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In addition, the user would pay a proposed station terminal charge of \$25/mo on both high- and low-density locations. \$10/mo for FX short-haul; or \$15/mo for



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On a typical 250-mile route a user who now pays \$488/mo would pay \$333/mo if he were in a high-density area at each end of his link. If the same user included one high-density and two low-density links in his network, the rate would be \$518/mo, according to AT&T estimates. The specialized carriers would charge

AT&T said it would also change its private line tariff to provide for the "resale" of its lines by value-added carriers such as Packet Communications Inc.

If the FCC approves the AT&T changes, it will take at least six months before the rates could go into effect, an FCC source estimated.

(Continued from Page 1)

- A failure by leasing operations generally to achieve the profits projected during 1971 and 1972.

Peat, Marwick recommended that if the implementation of the policy results in a forecasted loss in any future period for lessors, the prospective losses should be spread out over the profitable years preceding the period of anticipated losses by the provision of reserves, and that if the implementation of the policy results in a forecasted cumulative loss through Dec. 31, 1975, the loss should be recognized immediately as an additional charge for depreciation.

On Jan. 26, Burroughs then sued Advance for \$130,000 for "premature,

Advance agreed to upgrade to the B4700 system under the terms of the original contract (except for a higher monthly rental), the Advance suit said.

But, the suit continued, "contrary to all the defendant's warranties, representations and promises, the aforementioned electronic data processing equipment was not rendered fully operational and capable of performing all electronic data processing required in connection with plaintiff's operations."

The telephone number for the new

Lundell will continue to edit CW's computer industry section in addition to his duties as chief of the Washington Bureau. Molly Upton, in the Newton office, will be assistant editor of the industry section of the paper in addition to her duties as editor of the financial section.

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Burroughs Packaged B700s Have System/3-Like RPG, Key Entry

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The B700 is a single program machine. However, an interrupt-and-resume feature allows the operator to break into extended jobs for inquiries for an urgent management report. Pertinent data from the original job, including memory and register contents, is stored on disk cartridge. When a priority job is finished, the information is retrieved and reloaded and the system resumes processing at the point of the interrupt.

Part of the BMS software includes parameter-controlled Audit Entry programs which check direct entry information for accuracy of preparation and transmission to the system. Additionally, Audit Entry provides a written law for auditing purposes.

AE300 Off-Line System

As volumes increase, one or more free-standing Burroughs AE300 programmable systems can be added. Input through the AE300 keyboard is verified against a control program before being recorded on tape cassettes for subsequent loading into the B700.

Two central processors are available. The B705 processor speed is .5M cycle/sec. Main memory read/write cycle time is 1 μ sec for two bytes.

The B711 processor speed is 1M cycle/sec. Main memory read/write cycle time is again 1 μ sec for two bytes.

Disk cartridge drives available with the B700 have an average data access time of 80 msec including latency, transfer rates of 1.55 Mbit/sec and capacities of 4.6M bytes or 9.2M bytes.

The systems may also include magnetic tape cassette drives, on which each cassette may contain 240,000 characters. In addition, users may include one 9-channel, 800 bit/in. conventional mag tape unit.

Available line printers range from a

chain printer which prints at 90 line/min to a train printer which goes at 400 line/min with a 48-character set.

Two 80-column card readers may be attached to a B700 system; 96-column card equipment includes a simple reader or a full-blown reader/punch with up to six output stackers. This unit can be used off-line as a data recorder or a multifunction card machine.

Paper tape reading and punch peripherals compatible with all industry standards are also available.

The B700 system sells for between \$42,000 and \$110,000 or leases for \$950 to \$2,600/mo. Average sale price, Burroughs estimated, will be about \$50,000.

The BMS software will be separately priced as will be the training. Perhaps typical of BMS prices is a system for wholesalers and distributors which will have a one-time cost of \$7,500. Training will cost \$2,000.

CAI Students Want More

LOS ANGELES — The Los Angeles Unified School District is working to solve the problem of underachievement and absenteeism for 3,000 students in Watts junior and senior high schools, through the use of computer-assisted instruction (CAI).

The key to the program is individualism. One time-sharing system converses directly and individually with 32 students at once. Each student is addressed by name.

In turn, each student tells the computer, via his terminal, what subject he wants to study and even how difficult he wants the material to be.

Results of their progress with the CAI programs are stored for later analysis by the teacher. Periodic examinations show dramatic success for students taking remedial mathematics, the only CAI course offered the first year of the program.

Their average grade level in mathematical reasoning increased 1.4 years, after four months of CAI. Their com-

putational skills increased eight months, also after four months of CAI. At this point, attendance had improved over 20%, school officials said.

Terminal classes, which this year include reading and language arts, generally last 15 to 30 minutes and are designed to supplement, not replace, the teacher.

Approximately 80% of the total computer time is devoted to remedial exercises. Twenty percent of the time is for enrichment exercises.

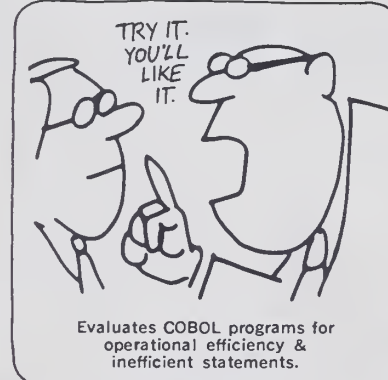
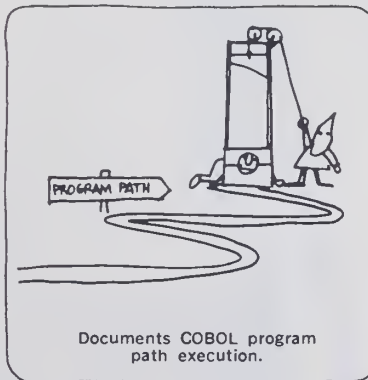
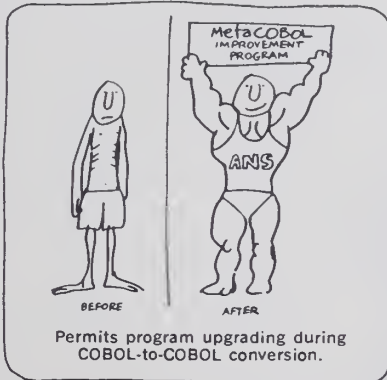
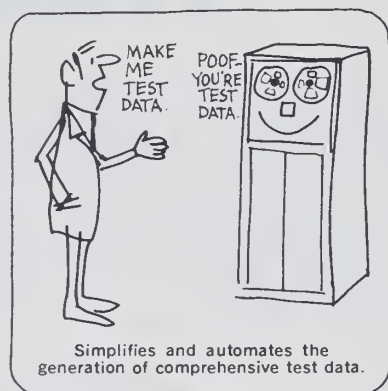
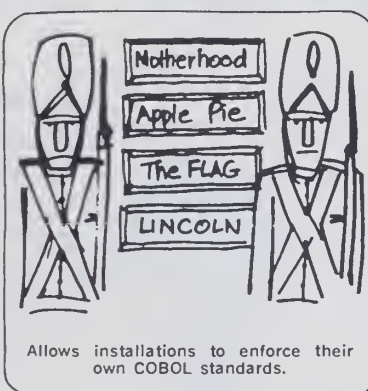
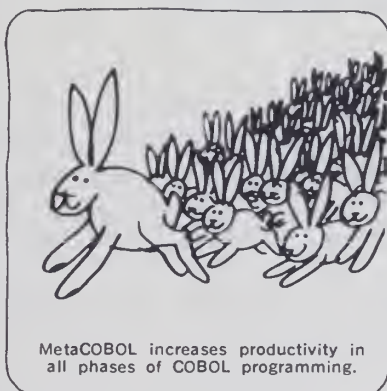
The program involves six schools. Each one has a staff of five: one teacher-coordinator and four teaching assistants, and is equipped with a Hewlett-Packard 2000C. Peripheral equipment includes 96 teleprinters and 96 CRT terminals.

The school district finances 30% of the program's costs. The Housing and Urban Development Agency (HUD) pays the rest through a Model Cities Program.

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Cobol Conformance Review Chance Lost

Special to Computerworld

WASHINGTON, D.C. — A chance for a general review of the situation regarding implementors' conformance with Cobol specifications was lost recently when the Conference on Data Systems Languages (Codasyl) Executive Committee abandoned attempts to organize the annual general meeting. The abandonment apparently occurred because no member of the executive committee volunteered to make the arrangements.

Control of Codasyl, however, is not affected by the dropping of the annual meeting. Codasyl control remains in the hands of the executive committee which elects its own chairman annually at the beginning of the year, unlike corporations where the directors are elected at the annual meeting.

The meeting, which was to have taken place here May 15, would have reviewed various recent developments. In addition, it would probably have considered the situation of Cobol conformance in the light of the recent abandonment of the Ansi audit routines which were made available in 1968.

Bob Barton, Honeywell Information Systems, assured the 1971 annual meeting that the audit routines were working and that they would make the Cobol language "more transferable." He also told the meeting the X3 committee would review on a quarterly basis conformance reports from all the implementors, based upon the use of the audit routines, and that these reports would be made public, if possible.

However, the current chairman of the operative X3 Committee recently reported that the audit routines are not working, and that the task may never be completed.

Worldwide Spy Net on the Horizon

WASHINGTON, D.C. — The Defense Intelligence Agency plans to begin running tests this spring on an Arpanet-like system to link all of the defense-sponsored intelligence agencies into one worldwide network.

The system, which carries the title of Experimental Analysts Station, will use PDP-11/45s as a front-end device for wide range of different computers, but primarily for Honeywell and IBM systems used in the network.

The hardware in the system will be completely transparent to the user, Air Force personnel have said, which will allow a user with IBM equipment to call for information from other computers in the network without any problems.

Presently, Bunker Ramo is configuring the system and is writing the software for it — software which the developers at Rome Air Development Center say will also be transparent to the user.

One of the objectives of the network,

besides allowing for the internetting among the different systems operated by Defense spy agencies is to allow for distributed data bases.

For example, in the system any computer or even one of the 11/45s will be able to access information kept in 2314 disk units at any other center in the network without going through the computer at that site.

To update information in one of the local data bases, however, the user would have to go through the computer at that site.

Ideally, the system will also be completely hardware transparent to the user, the developers indicated.

They want to make it possible for any analyst using the system to be able to call for information without having to use any special protocols or have any programming knowledge in order to access a computer at a different site.

Full Communications Processor 'Best Bet' for Terminal Mixing

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. — Data communications users should consider getting true communications processors as preprocessors for their systems and not just controllers, according to Maj. Glen Vincent of the Defense Intelligence Agency.

The major reason the user needs a full communications processor, he told the Computer Caravan/73 recently, is because it gives him more flexibility in his terminal selection task and lets him mix more terminals in his communications systems than do many front ends of the controller type.

In addition, it also gives the user some flexibility when he wants to replace his host computer with another host machine.

"With the true processor," he said, "the host machine can be replaced without having to replace the communications processor or network."

For this same reason, Vincent said the user was often better off getting a communications controller from some firm other than the mainframe supplier, so that if the mainframe was replaced the entire communications network would not have to be.

In addition, Vincent noted the true front-end processor could relieve the central computer of a great deal of overhead work, adding this could run up to 40% of the central processor's time in some installations.

"In some cases where the CPU is overloaded, this savings in CPU time might be a reason in itself for going to a communications processor without any of the other factors having to be considered," he stated.

However, he noted, most central computers are today being underutilized, so this factor might not be the deciding one in present installations.

A further reason for getting such a system, he claimed, could be that the communications processor allows the user to do some things a controller will not allow.

For example, it could ease a user's connection with a network of other systems, he said, and it would also be used for some local work such as printing operations or local small-scale processing.

In addition, a communications processor allows a user to offer the people using the system some extra services while the host computer was down for maintenance or for some other reason.

Reliability, Cost Brought One User To Independent Line

WASHINGTON, D.C. — Most of the reasons for using independent peripheral equipment revolve around the price savings the user can get from the independent's gear when compared with the same piece of equipment from IBM.

But at least one user at the Caravan here got into the world of the independents because of the increased reliability available with that type of equipment.

Dave Whitestone, DP manager at Potomac Electric Power Co., stated that both reliability and the cost factor led Pepco toward independents.

In 1969, he said, the firm was experiencing reliability problems with its IBM 2401 tape drives.

Pleasant Dreams

After an evaluation, Pepco turned to the Ampex tape drives that replaced the 2401s. In addition to providing Pepco with savings of more than \$5,000 yearly, he indicated the increased reliability with the Ampex units, when compared with the IBM ones, would have been enough to justify the switch even without the savings.

The only problem with the Ampex drives, he noted, was when the firm upgraded to a 360/50 from a 360/40 and IBM claimed it could not run its diagnostics on the new system from the Ampex tape drives.

But after some negotiating, Pepco was able to convince IBM to use the independent drives for the installation checkouts.

Happy with the tape drive experiment, Pepco then replaced IBM large-core store with extended memory units from IBM. With this move, the utility found it could get twice the capacity, and twice the speed, for only a 50% increase in price.

Today the organization presently has independent disk drives in addition to the tape drives and memory units — both single-density and dual-density units.

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Rail Freight Yard Routes Take Direction From Mini

SELKIRK, N.Y. — The Penn Central Railroad's Alfred E. Perlman Yard is one of the busiest freight train classification yards in the U.S. And two minicomputers make it one of the safest.

The minis verify the route a switching engine will take inside the yard, and prevent other engines from being on that route or conflicting routes.

The freight yard is divided into three yards: receiving, classification and departure. Individual freight cars, ready to leave for their destinations, are shunted onto the appropriate track, where they join other cars going to the same place.

When a train is to be formed, a yard conductor in a tower overlooking the yard directs one of the switching engines to a classification track. He has the cars on that track transferred to the track in the departure yard where the train is being assembled.

The yard conductor must select the route the switching engine takes to get from the classification yard to the departure yard. It is this route the

Data General Nova computer verifies and secures.

In practice, an operator selects one of the yard's 55 routes, and the Nova, through hard-wired connections to the track switches, checks it to see if it is available. If there already is a train on the route, the yard conductor can either select an alternate route or wait until the train is off that route.

If the route is clear, the dispatcher pushes a button and the mini activates that route by moving the switches into the proper position and locking them. The Nova then checks to make sure all the field hardware responded correctly to the command. If a device did not respond, the mini notes it as an alarm condition and notifies the yard conductor.

If another yard conductor wants to use the same route, the mini will detect the locked switches and tell him the route is unavailable. As the switching engine pulls a line of cars over a switch, the computer detects the movement and releases that segment of track back to the yard conductor's control.

Childbirth Data May Set Stage For Study on Mental Diseases

WASHINGTON, D.C. — A comprehensive 14-year study of childbirth is nearing completion but the six million pieces of data stored on computer tapes may set the stage for a second study on the causes and cures for such diseases as mental retardation and cerebral palsy.

The aim of the original study, sponsored by the National Institute of Neurological Diseases and Stroke, was to see how the events of pregnancy affected the child's later physical and mental development. Information on 56,000 mothers and 40,000 of their children during the first eight years of life was stored

on a computer.

One of the early findings included the relationship of the mother's weight gain to the baby's birth weight which is known to affect the baby's future health; doctors no longer restrict a mother's weight gain during pregnancy as they did prior to this study.

When the study is completed, the data will be used for other research projects. Doctors believe there are clues hidden in the childbirth data for the cure and prevention of neurological diseases such as mental retardation and cerebral palsy.

Mini Heralds POWs' Return

IRVINE, Calif. — When the first returning prisoner of war stepped off the plane at Clark Field, a TV camera focused in on Capt. Jeremiah A. Denton Jr. of Virginia Beach, Va. But the instantaneous biographical information about Denton came from half a world away where a minicomputer sent subtitle descriptors across the nation's TV screens.

Hours before this historical arrival, some 590 names had been read into a Varian 620. Full names, rank, service and related information were pro-

vided by the government. But individual order of arrival could not be anticipated.

As the visual and audio signals came off a communications satellite, a keyboard operator at the TV studio in New York City listened to the name announced at Clark Field. He immediately keyed in the first three letters of the last name, "DEN." Out came the full text on Jeremiah Denton, mixed electronically with the signals from the Philippines, and transmitted nationwide by ABC network.

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News Wrapup

Airport Subway System 'Stalls'

SEATTLE — The Sea-Tac airport automated subway system [CW, Oct. 25], ready to roll since late 1972, has stalled on the tracks of legality, waiting for several contract disagreements to be settled.

The Port of Seattle commissioners have agreed to pay \$5.9 million for the underground transit system. But Westinghouse Electric Corp., which built and installed the highly computerized system, wants an additional \$650,000. Most of the difference stems from a \$400,000 disagreement on contractual "escalation costs."

That disagreement is coupled with ongoing, still unsettled negotiations between Sea-Tac and the airlines over higher lease fees the airport wants to charge. The two-loop subway system serves two satellite passenger terminals; the airlines are reluctant to pay increased fees for the use of the satellite centers.

No starting date for the Sea-Tac system has been predicted.

3,000 Dads 'in Debt' Due to Key punch Error

SACRAMENTO, Calif. — A key punch error in the county DP center here resulted in 3,000 erroneous bills to fathers who had already made monthly child support payments.

According to county officials, the computer was making its February run to check for all payments due in January. But an operator punched in "March" instead of "February" so the computer checked for all February payments.

Naturally, there were no February payments yet, so the computer sent delinquency notices to 3,000 fathers.

The district attorney urged all fathers who received the notices, which threatened legal action within five days, to ignore them.

Czechs Ask Hawaiians for Conversion Help

HONOLULU — The city Department of Information Systems here received an unexpected request for programming help recently — from Prague, Czechoslovakia.

The Czechoslovakia Institute for Regional Planning wrote to its counterpart here for help in converting its Symp program (which prepares data for plotting) from 360/40 OS to DOS.

The conversion was necessary, the Czechs wrote, for "financial and time reasons," due to a reduction from 256K to 110K.

Honolulu sent the Czechs a copy of its DOS version of Symp along with source listings, notes on the conversion and "alohas."

Milos Stepanek, director of the Czech Institute, wrote that he learned Honolulu had the program he needed through Harvard's Laboratory for Computer Graphics and Spatial Analysis.

Dartmouth Computer Achieves 99.8% Uptime

HANOVER, N.H. — Computers sometimes take scheduled vacations for maintenance, etc., but hopefully, they rarely take unscheduled vacations, i.e., breakdowns. The Kiewit Center computer at Dartmouth College is no exception.

In fact, "of the 500 hours of time-sharing scheduled for the month of December, 99.8733% was available to users. The lost time totaled 38 minutes," according to Dr. Thomas E. Kurtz, director of the center.

In all of 1972, the Dartmouth Time-Sharing System missed only 60 hours of its 6,000 scheduled hours.

System uses ranged from homework problems to computer chess games to financial projections for the college's administration.

Computer Prediction of Heart Disease Seen

NEW YORK — A heart specialist predicted that within 10 years computers will be used to predict the onset of heart disease.

"I believe," said Dr. Charles A. Bertrand, chairman of the cardiovascular committee of the New York State Medical Society, "that these predictions will be accurate in the majority of patients above the age of 40."

Bertrand's prediction was just one of 30 placed in a time capsule by the New York Heart Association here.

Will the prediction come true? One prediction made 10 years ago at a similar ceremony did come true — a successful human heart transplant.

DP Specialist Named Railroad Man of Year

CHICAGO — A computer specialist has been named the railroad industry's Man of the Year for 1972.

James W. Germany was selected by *Modern Railroads* magazine because "the emergence and growing effectiveness of comprehensive, sophisticated, computerized management information and control systems" is revolutionizing the industry.

Germany supervised the installation of a \$22-million railroad computer system for the Southern Pacific. The SP offered the system free to other railroads and it is now being used by the Union Pacific, is being installed on the Burlington Northern and is used with modifications by the Missouri Pacific.

'Cross at the Green and Not in Between'

PORTLAND, Ore. — In a world of law enforcement in which the computer plays a significant role, fugitives must watch every step they make — literally.

John R. Outlaw was cited for jaywalking here and was held while police made a routine check of their files.

The computer came up with an outstanding warrant issued over a year ago charging Outlaw with larceny in Kansas City, Mo. He was held awaiting extradition proceedings.

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Editorial

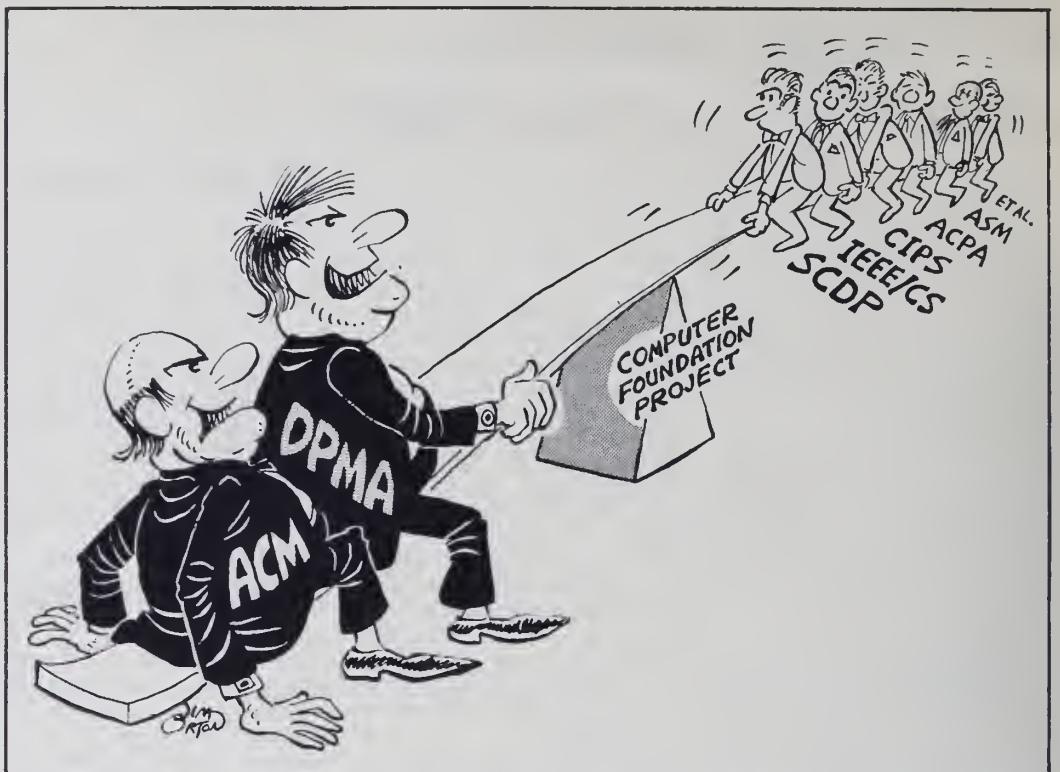
Off-Site Emphasis

IBM has served notice it will no longer provide CPU time for production work at its data centers.

At the same time it has renewed its commitment to support users with program testing at IBM installations. While attributing the move to the CDC settlement, the IBM announcement is also recognizing the increased sophistication of the user.

The prospective user is demanding more and more authoritative proof that the system he is contemplating will actually perform "as advertised."

If IBM data centers now plan to provide more off-site support to the user with program testing, benchmarks and other systems work, all users will benefit.



'So If We Don't Like the Way Things Are Going, We Can Always Stop Playing.'

Manage Yourself First Before Directing Others

Working in a computer center would be fun if it weren't for the people.

Understanding people requires comprehension of the other person's idea of what will benefit him most — his private notion of what constitutes his own best interests. (See Gellerman's prize-winning American Management Association book, *Motivation and Productivity*.)

A person's view of his own psychological advantage depends upon his assessment of the en-

vironment, particularly as to power ("To what degree can I control it?") and reward ("Is it benevolent or harsh?").

For example, someone who expects much power over his environment and high rewards will probably drive hard for achievement. Another, also expecting much power to influence his environment, but with serious doubts about its rewards, will probably fight hard for money. A third, with low expectations as to both power and reward,

will probably settle for a steady job.

True to Yourself?

Each of us is thus always following a sensible strategy to be oneself in the kind of world he thinks he lives in. It is more a matter of striving to be a certain kind of person than it is a question of having certain things.

If your computer operators, for example, believe they do not have a significant, self-respecting role, this may surface indirectly

as excessive wage demands (because pressuring management recovers some of the dignity that has been denied).

To be an effective manager, support your subordinates psychologically. Standards and measurements, for example, are tools and not ends in themselves. Accordingly, subordinates should work in their own way (so long as the work gets done). Programmers who see their own ingenuity in the results are usually more productive than those who contribute little but their obedience to instructions.

This freedom from specific direction does not produce loafing — if general goals are set and subordinates help set them, actually participating in the decisions. This philosophy, which requires that you trust your people to work properly, usually results in high productivity (which is mostly controlled by your subordinates).

Freedom is usually more possible for systems analysts and programmers than it is for data conversion people and computer operators, however, because the technology tends to strap us to very specific requirements in operations.

The alternative — exercising control through authority — emphasizes job descriptions, standard methods, quota, budgets, etc. This philosophy usually results in greater direct control for you but at the price of lower productivity.

The antagonism of subordinates is a normal problem of leadership. Using your power with care and justice is usually the appropriate answer.

Since much depends upon our informal authority and because we can expect little help from the formal authority of our position in the hierarchy, the ca-

capacity to generate informal authority is important. Before promoting a programmer to lead programmer, for example, observe whether his associates now turn to him for advice and guidance. If so, he has established his informal authority and you probably risk little promoting him because you would simply formalize what is already a fact.

Possession of power often creates an appetite for more power, since power helps you achieve your own psychological advantage. Power plays soon consume your power, though.

It is seldom wise to invoke authority and to use compulsion, because it suggests that you are a weak leader. Using your ability to persuade is much better, since it builds organizational strengths.

One exception is probably when your authority is directly and openly challenged by a subordinate (typically in association with some kind of ultimatum). That may be the time to concentrate every ounce of authority you can on crushing the challenge.

Before you can manage others, you must manage yourself. Whenever — usually in times of urgency and stress — you are arbitrary, abrupt or less than considerate of the feelings of subordinates, of computer users or even of superiors, you are not managing yourself.

This does not mean a manager is timid or weak. He does indeed make the tough, difficult decisions, but he does so only after evaluating his own motives and feelings. Then he acts so as to achieve the installation's proper purposes and objectives, and not, say, to put a software programmer in his place.

Directing the activities of others is a complex part of the management function, combining leadership, motivation and guidance. It probably begins with the idea that you cannot direct others until you are willing to rely on them, to trust them.

(Frank Greenwood is director of the computer center at the University of Montana.)

Letters to the Editor

Giving Facts Clearly Or Grinding the Axe?

As a long-term reader of *Computerworld*, I have recognized a very strong bias against IBM in the news columns and editorials. The net value of the publication to me, however, is such that I have ignored this bias to a large degree.

I think it is obvious that Alan Taylor has had little or no experience as an IBM user. In fact, most of the criticism of IBM I detect comes from sources which certainly should be highly suspect.

I would like to make three very specific points. First, the Feb. 14 editorial urges IBM users who are dissatisfied with IBM performance to contact the Justice Department and inform them of instances where they have "been injured by illegal or pressure marketing tactics."

In all fairness it might be useful for CW to request users of all manufacturers to make an effort, since those of us who have used competitive equipment as well as IBM's know well the routine and comparative performances in the industry.

It is very probable that the Justice Department does not have the same insight. In addition, CW might urge IBM users who have been more impressed with IBM performance and can cite significant successes which were accomplished by IBM pressure.

In short, one would believe that CW is interested in presenting the facts clearly whether they favor IBM or not. Instead, it appears that CW clearly has an axe to grind, although the motive is not clear.

The article concerning the Telex-IBM suits on Page 29 of the Feb. 14 issue refers to sources that indicate what "may well be the IBM strategy."

Is it too much to ask of an objective reporter the general nature of that news source? I can understand reluctance to name names but one ought to know if the source is a Telex executive, a Justice Department attorney, an IBM competitor, etc.

The lead article of that issue on IBM maintenance markups indicates the same tendency to obscure the source of analysis and information which the reader has a right to know.

I believe an unbiased content analysis of CW would reveal that these two illustrations are not unusual in reporting on IBM.

My comments concerning CW are, of course, from the user's point of view and I have to recognize that CW may serve other interests.

If CW is not primarily focused on the EDP user, then I think we users have a right to know what interests are represented by CW.

Finally, I would like to add my voice to those who support a bundled IBM. For customer service, for sales effort, for maintenance support, non-competitive

activity is reason for many to reject some of the data processing giants who like to make a profit at the user's expense while denying the users the opportunity to deal with the companies with whom we wish to do business.

No knowledgeable person believes that IBM "walks on water," and CW's articles, such as the article on maintenance, are very beneficial to the IBM customer. It would be more valuable if we could trust the source.

W.R. McCartin
Phoenix, Md.

Re: Point one, "IBM performance," is not accurate. The editorial states "illegal or anti-competitive marketing practices." Computerworld sincerely hopes that anyone with information beneficial to IBM will volunteer it to the large legal contingent defending IBM. Remember that the Justice Department has already decided what it wants — after all, it initiated the suit. It is now up to either the court or a consent decree type committee to settle the case.

Re: Point two . . . in this specific case, the source of the article is of little importance, as we explain the logic of the premise to the nth degree.

Re: Point three . . . Alan Taylor provided CW with copies of the depositions, IBM documents and other material he used to prepare his story. A bibliography is available to anyone on request. Ed.

How Deep Are DP's Problems?

Misforwarded Letter Sets Off Billing Controversy

Marilynn D. Evans moved from New York to Massachusetts four years ago. When she moved she gave the Post Office a forwarding address. Even so, she was surprised to receive a letter recently that had been forwarded from her old address.

She noted the letter was not for her, however, but for a Lewis Evans. It had been forwarded to her by mistake so she put it back into the mail.

That proved to be a mistake.

The letter was a bill and was apparently returned to the sender. In time it must have been received in the sender's data processing department. Someone there noted the new address, while ignoring the statement that the bill had been sent to the wrong person. A change of address card was then created and the computer files updated with the erroneous information that Lewis Evans now lived in Massachusetts.

In due time, the computer ran the monthly bills and dunning notices. One bill was addressed to the nonexistent L. Evans of Massachusetts. This was duly delivered by the Post Office to Marilyn Evans.

Although it was not addressed correctly to anyone in the house, she opened the letter. She thought her son might be receiving unsuitable mail and she wanted to know about it. But the letter was not for her son.

It was a bill, claimed to be overdue, for a sewing machine. The sender was Singer Sewing Machines, in Long Island, N.Y.

Again, she returned the letter noting this had nothing to do with her and that there was no L. Evans at that address.

More Letters

But that was only the beginning. The monthly letters continued to arrive. The local Massachusetts Singer branch promised to look into the matter until it realized it was not a local account. The branch told her she would have to work with the New York people.

Already getting annoyed she phoned the Long Island office collect. It refused to accept the charges so no verbal contact was made between the parties involved. Written contact continued.

One letter told her that Singer valued her so much it would be glad to extend her more credit for her needs! Needless to say, by this time the last firm she would go to for a sewing machine would be Singer.

Then she just started throwing the bills away.

This was how it stood in January 1973. Then came a new type of letter from another computer system — a debt collection agency.

A copy of the agency's bill is reproduced in Figure 1. The document:

- Unequivocally claims the addressee owes the specified amount.
- Talks about a "nationwide" service of the debt collection agency and by implication threatens the credit rating of Marilyn Evans, through the nationwide service.

- Demands that the payment itself be turned over to the agency, thus leaving the payee with no evidence of payment to any authorized person.

What Marilyn Evans will do now, I do not know. She will have to do something because the credit rating which is now being attacked belongs to her even though the bill never did. She does not think the fact that no L. Evans is at the

... "Our systems can be managed so easily by machines that human supervision of the actions taken on behalf of people has dwindled until, in many computerized systems, it is now nonexistent."

address given will stop the credit-rating computers.

After the way her address was put into someone else's file she expects the credit-rating computers to blame any person who happens to live at that address.

And she doubts whether anyone at the debt collection agency will listen to her, anymore than Singer did. So she is a troubled woman.

And her trouble is our profession's trouble.

For it is our systems that make unverified updates. It is our computer systems that encourage the use of turnaround documents that deny evidence of demands made. It is our systems that are so easily abused by selectively ignoring some input or by pushing it onto some other office, etc. And it is our systems that can be managed so easily by machines that human supervision of the actions taken on behalf of people has dwindled until, in many computerized systems, it is now nonexistent.

And that is our professional responsibility. When we estimate the savings in manpower involved in computerizing applications — when we say that applications are suitable for computerization without requiring additional supervisory

The Taylor Report

By Alan Taylor, CDP



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| 01/29/73 | 172.92 | | 172.92 |

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REMIT IN FULL OR TELL US WHAT YOU CAN DO.
IN ANY EVENT THIS SHOULD NOT BE IGNORED ANY LONGER.

CREDIT IS A VALUABLE ASSET

PAYCO AMERICAN COMPANIES PROVIDE NATIONWIDE COVERAGE

Figure 1. Document sent to Marilyn Evans from debt collection agency demanding payment for bill she never incurred.

manpower — then we are making technical judgments.

Yet, do we have the right to make these technical judgments? Do the observed facts, as opposed to the theoretical possibilities which we started out with some 20 years ago, support the thesis upon which these judgments rest? If the facts that surround us today do not support our contentions of past years, then our responsibility is grave indeed.

As far as I can see, the facts have not yet been determined. Each time I probe matters a little deeper I come up with more, rather than less problems.

We recently saw the second level of the mail-billing problem where the mails had been blamed for unnecessary finance charges [CW, Feb. 21]. But, instead of the mails, it turned out the delay in posting money received was the real culprit.

Similarly, dunning letters were always thought to be a problem of slow payers. The idea that an address file could be updated from an undelivered letter, and

that claims of mistaken identity could be ignored was unthinkable. Yet it happened. And it did not happen in an innocent, unsophisticated company either, but in one of the computer companies (Singer Business Machines).

Supervisory weakness, probably due to inadequate appreciation of the need for supervision of data processing applications, appears to be the problem in the Evans case.

Whether it is the problem or not, I do not know. Perhaps when we turn over this problem we will find another one.

But I do know that each time new levels are reached in investigating problems, the data processing operation appears to be more involved. How deeply the problem really lies with data processing we have yet to discover.

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Vacation Costlier Than You Think

While the debate goes on about poor billing practices and other data processing ethical problems, some light has been shed on the situation of Melvin Tolhurst and his BankAmericard [CW, Dec. 6].

L. Brazinsky, manager of operations for

The Readers Respond

BT Credit Co. Inc., which does the billing for BankAmericard, wrote Tolhurst:

"Your account (4250-132-002-723) is in billing cycle 3 which is produced on the 9th of each month. Our production schedule calls for statements to be collated with the applicable sales drafts and mailed to our cardholders within one week of the billing date. Our cardholders then have 25 days from the billing date to make payments without incurring a finance charge on the purchase balance..."

In other words, if payment is received at BT Credit by the 4th of the month (25 days from the 9th of the preceding month) there would be no finance charge assessed.

Tolhurst replied:

"The second paragraph of your letter... refers to 25 days your cardholders have to make payments without a finance charge. However, your production schedule claims seven of the cardholders 25 days, and the mails probably claim another two.

"This leaves the cardholder with 16 days in which to make payment, unless he chooses to pay by mail, in which case he has 14 days, assuming optimal mail delivery.

"If this poor cardholder chooses to take a two-week vacation, he is bound to pay for it in BankAmericard finance charges, unless his payment miraculously coincides with your payment schedule."

Computer is not a 3-letter word.

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For variety of reasons, IBM has dominated the EDP systems industry in a way that is almost unheard of in American business, except for publicly granted monopolies. But there are alternatives to the big boy. And that's what our March 28th Supplement is all about: *The Non-IBM World*.

Edited by Computerworld's Mike Weinstein, this study will include a look at the state of the industry, and a report on seven of IBM's competitors.

Each of these companies — from Honeywell to Xerox Data Systems, has its own personality and its own place in the market. We'll be looking at their history, what they offer and where they stand. We'll also get opinions from their users, and try to create a picture of each one's strengths and weaknesses — to give you a clear idea of where it's at.

If you're a user who wants to look past IBM's looming frame, then our March 28th Supplement is the place to start. And if you're a marketer who wants to talk to the people who run this industry, your ad should be there when *The Non-IBM World* goes out. The supplement closes on March 9th. For details, just contact the nearest Computerworld Representative: Boston, Bob Ziegel, (617) 332-5606. New York, Don Fagan (212) 594-5644. Los Angeles, Bob Byrne (213) 477-4208. San Francisco, Bill Healey (415) 362-8547. Or write to: Judy Milford, Computerworld, 797 Washington Street, Newton, Mass. 02160.

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Professional's Viewpoint

370/125, by Limiting Peripherals, Presents Step Backward for User

By Marshall E. Maynes

Special to Computerworld

Many users like to have a small computer to back up a larger one. Sometimes the larger one is in the same installation, sometimes it is not — but the concept of

Data processing professionals or societies wishing to express views on professional matters in this column are requested to write the Professional Viewpoint Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

having computer backup is as valuable in 1973 as it was in 1963.

In 1963, indeed, the backup characteristics of computers were often the

decisive point upon which sales were won or lost.

Since the introduction of the 360 series, backup capabilities have often come to be taken for granted. True, unless the appropriate core was present, one might not be able to use the actual programs. But at least a user would be able to connect the same type of devices to both of his systems, and so be able to move disks and tapes around as needed. This was a major advance in the state of the art.

With this ability to control their environments, moreover, more and more users now take advantage of it. They buy some of the equipment which they should be able to use for a number of years — tapes, disks, printers. Many 360 and 370 users now own their own 2314/2319 disk-type drives.

They expect to be able to attach them to their own new, smaller computer system, to back up the larger central system. This could be done with the 360 family. There is no technical problem in doing so.

But it cannot be so readily done with the new 370/125!

On the 370/125 there is a 3333 disk unit. It comes with two spindles for 3336 disk packs. IBM customers can add one or two more spindles for a total of four spindles, or 400M bytes. This may well be enough disk to handle all the user's I/O needs, including virtual memory paging.

But while the disk system has the capacity the user needs, it may not be the type he needs. Many users, for instance, will want to transfer 2316 packs between systems. This cannot be done on the 370/125.

The tape situation is similar. The 370/125 supports only 3411 and 3410 drives. The user with his own tapes is therefore being driven to make a new investment.

The most obvious reason for this move by IBM is that there are many independent peripheral manufacturers who can supply faster, more reliable and less expensive devices of the 2314/2319 type and tape equipment.

The independents have enhanced the 2314/2319 concept with engineering advances in order to attain this superiority. These include the use of dual density and voice coil.

The original concept of modularity offered by the IBM 360 and 370 systems was, and is, a sound concept which gave the users the ability to tailor their own systems to their own needs. They could change processors without changing peripherals.

IBM's current approach, if the 370/125 is indicative, is not only that the mainframe manufacturer shall be able to dictate how peripherals will be connected, and whose equipment will be used with its computers, but IBM wants to be able to tell the user just which type of peripheral he can have.

From the user's point of view, restricting the type of peripherals, and so downgrading the usefulness of the various computer systems being marketed, is not a fair or a reasonable restriction. It is certainly not an advance in the state of computers, and I see it as a retrogressive move.

Marshall Maynes is a systems specialist for Calcomp.

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about the entire "flexibility mystique" that's so much encouraged by the computer manufacturers. Ask yourself how much flexibility you really need. And remember: if you are now renting from month to month, and if you can predict your computing requirements with even modest accuracy, you're probably wasting thousands of dollars on unnecessary flexibility. Dollars you could be spending on staff, a faster CPU, new software, more memory, or whatever else you really do need.

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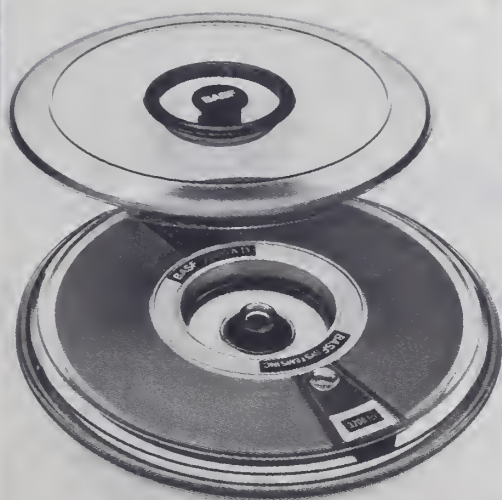
The computer will use information regarding local traffic patterns and "fire demand zones" and will also take into account future expansions in the city.

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Random Notes

Naval Center Giving Away GPSS Version for CDC 6600

WARMINSTER, Pa. — CDC 6600 users can run General Purpose Simulation System problems on their equipment with NGPSS/6000, a version of GPSS-V developed for the Navy by Norden division of United Aircraft. The new implementation runs under the Scope 3.3 operating system, Norden said.

A copy of the new simulation package, coded in Cobol and requiring 18K words to assemble and 14K words to execute, is available free to users who send their request and a magnetic tape to the Naval Air Development Center, here.

'Minicomm' Monitor Extended To Support Local, Remote CRTs

NEW YORK — The Minicomm communications monitor for DOS/360 users has been enhanced by Programming Methods to support CRT terminals, including IBM's 2260 and 3270 units, and all the GTE video terminals, as well as the IBM 2740 hard-copy device.

Remote support under the multiprogramming version of Minicomm takes 4.5K to 8K bytes. The non-multiprogramming version requires a 24K 360/22, 25 or 30 and costs \$8,000. The MP version costs \$10,000. Programming Methods division of GTE Information Systems is at 1301 Avenue of the Americas, 10019.

Interactive Adds Data Base Of Corporate Sales, Purchases

WALTHAM, Mass. — Corporate planners, marketing managers and financial analysts can access detailed information about dollar volumes of sales and purchases of U.S. companies, through a new time-sharing service offered by Interactive Data Corp.

The service also provides information about more than 500 products or services utilized by the companies at their various sites. In addition, users may interface the data from this new service with data from other databanks on the Interactive system. Interactive is at 486 Totten Pond Road, 02154.

Data-Tek Adds New Services

PHILADELPHIA — The Data-Tek time-sharing service has implemented two new capabilities for its subscribers: an APL compiler that can be accessed from a broad range of terminals and supports a workspace of 87K bytes; and an Xtran-to-Fortran IV conversion system.

The new APL interfaces with terminals having the extended APL character sets, but with conventional keyboards as well. Strikeovers to duplicate special APL characters are avoided through the use of mnemonic codes, Data-Tek explained, from 3401 Market St., 19104.

Interactive Store/Retrieve

'Basis-70' Solves Special User Needs

By Don Leavitt
Of the CW Staff

COLUMBUS, Ohio — Users with unique needs in interactive storage and retrieval of data in various forms may be able to get help through the Battelle Automated Search Information System (Basis-70) run by Battelle Memorial Institute.

Basis-70 was developed by Battelle to meet its in-house needs and has been operational since mid-1970. Its capabilities are impressive, growing and available to outside users, but only under very closely defined conditions.

Battelle is a non-profit organization interested, among other things, in learning more about data storage and retrieval. Therefore any new Basis-70 projects must add to the institute's knowledge and experience, rather than simply utilizing capabilities that already exist.

Currently there are almost 30 data bases loaded into Battelle's CDC 6400 under Basis-70, covering many areas. The largest base thus far is one of 200 million characters, which covers three years of abstracts from the National Technical Information Services (NTIS) operation in Springfield, Va.

Basis-70 itself is the nucleus of a system that is tailored for each user. The tailoring in one case provides the ability to scan a data base, or — more accurately — its index, for key word matches, near-matches or a Boolean combination of matches.

Output of the stored data is normally a printout on the user's CRT, teletypewriter or on a Battelle high-speed printer.

The initial capability of retrieving data (by field if the records are organized in that fashion) is being augmented, however,

by support for arithmetic operations on the stored data, the results of which can be displayed or printed.

More exotic applications currently include an interface, through a CRT terminal, of a computerized data file, a related microfiche file and the user. With this integrated approach the user may retrieve and work on data from the computerized file, and update the microfiche data being presented by keyed-in entries.

As they are keyed-in, these corrections are shown on the CRT screen, overlaying the out-of-date data on the microfiche image, but they are also stored on a disk file and shown every time that microfiche record is called to the screen.

Ultimately, if the number of corrections grows large enough to slow the effective use of the existing microfiche records, the records themselves should be recreated in updated form and the computer-based correction file erased, a Battelle spokesman said.

For another Basis-70 project, Battelle has implemented a graphics operation linked to an accessible data file. This version of the system allows the user to extract data from the file and plot it on a hard-copy unit or create a magnetic tape for later projection on a Stromberg-Datagraphix device, which shows the graphic output on a CRT screen and copies it onto 35mm film.

Since Battelle has to tailor Basis-70 for the user, the institute also handles the indexing and conversion of the user's data base. The completed data base can be accessed at 10 or 450 char./sec over dial-up telephone lines.

Battelle is at 505 King Ave., 43201.

'DBD' Cuts Across Applications To Check Data Base Duplication

MIAMI — Installations which have built up multiple data set listings under Cincom System's Total and other data base or file management systems can now identify and therefore control data redundancy, through cross-referencing reports generated by the Data Base Directory (DBD) package from Eastern Airlines.

Total itself allows its users to list all of the data fields related to a specific application, or list a limited subset of the complete list for programmers and analysts working on a particular portion of the application.

But duplication of fields from application to application is not yet identifiable under the basic Total system, Cincom qualified. DBD, on the other hand, produces as many as 11 different reports which aid the user in clarifying the relationships of elements to like elements, elements to data sets, and data sets to programs.

Thus it provides a dictionary of data terms with cross-referencing to synonyms even across application lines.

Summarize Data Elements

DBD reports can summarize data from a variety of sources as well as from different application areas. Through DBD a Total user can list data sets related to operations controlled by Informatics' Mark IV or any other file management system, an Eastern spokesman explained.

Thus, he added, DBD is an enhancement package that removes data base documentation responsibility from the application programmer.

DBD is made up of two separate jobs. An update and edit program maintains the user's data base, and the report pro-

gram extracts data from that base for the reports. The edit routines include the flagging of erroneously coded maintenance transactions, and the printout of both old and new conditions of any data record changed by a valid transaction.

Written in Cobol, DBD can be installed by the user, Eastern said. The one-time license fee is \$3,000 for the source modules, JCL decks and samples of input documents and supporting documentation.

Eastern's DP Sales office is at Miami International Airport, 33148.

'Route/Guide' Monitors Trucks

CINCINNATI, Ohio — Distributors or others with large fleets of vehicles operating between a network of cities may be able to reduce their transportation costs and save time for their planning staffs with the Route/Guide package from Management Decisions Development Corp. (MDDC).

The program determines the best over-the-road routes between cities and prepares a guide, complete for each pair of cities with total distance and/or travel time. It can also provide mileage breakdowns by state, and detailed routing in terms of either connecting highways or intermediate cities.

Route/Guide operates in either on-line interactive or a batch processing mode. It is designed to carry enough information to allow effective judgments on travel time, distance and cost tradeoffs. The user can, for example, explicitly include in the optimization the time or cost incurred in passing through enroute cities.

The software permits users to classify roads independently within each state by speed, cost or other factors for the trade-off studies.

New cities and road links as well as changes in travel times, costs and mandatory routings are accommodated. The output of the system, useful for planning of the routes themselves, is intended to interface directly with related applications including driver payroll and state mileage reporting.

Route/Guide is written in Cobol and except in the optional on-line module, it operates under DOS/360 in a minimum of 32K bytes.

Since the system is modular, the user purchases only those elements he needs. The base module costs \$7,500. The on-line function adds \$1,500 to the price.

MDDC is at 680 Northland Road, 45240.

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NCSS Has Big Plans for T/S Net

By Don Leavitt
Of the CW Staff

NORWALK, Conn. — National CSS (NCSS) is acquiring more 360/67s, but is moving up to 370 gear as well. It is beginning to implement an Arpa-like communications network and is actively studying the possibility of adding a Multics system from Honeywell to its facilities.

The result of all this activity, according to NCSS Vice-President Richard Bayles, should be a remote-computing service that is more reliable and more flexible than the present one.

File Sharing Extended

The company has upgraded its Sunnyvale, Calif., data center to a dual 360/67 and will be adding two more dual 67 systems to its Stamford, Conn., location in the next three months. The dual configurations, he explained, allow file sharing by concurrent users and provide system resource redundancy in case of hardware failure.

The new communications facilities, utilizing programmed minicomputers rather than conventional multiplexers and CPU front ends, will aid in balancing line loads and in finding alternate paths between terminal and CPU, all without user intervention or knowledge, Bayles said.

NCSS has signed a development agreement with Honeywell in connection with the recently announced Multics time-sharing system. But Multics will actually be installed "only if Honeywell lives up to its commitments to make it a commercially viable system," Bayles said.

Developed over seven years at MIT, Multics is a virtual memory system that includes hardwired "rings" or layers of accessibility that should prevent unauthorized disclosure of programs or data better than more conventional password systems.

System of Rings

Multics also has an operating system spread across several rings. The central core is essentially untouchable but users may modify or create system commands to suit their purposes, without imposing the new commands on any other user.

Implementation of a good level of Cobol is one of the key commitments faced by Honeywell, according to Bayles. True compatibility with the GCOS operating system — used by the Honeywell 600/6000 series CPUs from which Multics was developed — is another area of concern, he said.

There are "chinks" in Multics' ability to provide real un-

interrupted service in the event of a system failure, he added.

The new network is expected to provide a common set of protocols between varied CPUs that NCSS may install, but it will not be extended to allow users to attach their own CPUs directly to the network, as they may now do on Tymshare Inc.'s Tymnet network, also based on Arpa principles.

NCSS will be using modified DEC PDP-11s as its Interface Message Processors (IMP). Arpa itself utilizes Honeywell 316s and 516s; Tymshare uses modified Varian 620s. With minis at both ends of the communications link users will be able to transmit at 9,600 bit/sec over voice-grade lines, and will not be required to use broadband circuits as Arpa users now do, Bayles said.

The prototype equipment is now being tested with "very local traffic" within the Stamford data center.

A 370/145 will be going into Stamford in June, primarily to test some of the peripherals and software support planned for the 370/168, scheduled for delivery in October. When fully operational, the 168 is expected to replace one of the dual 67s. The 145 may be used to support remote-batch work, once it has finished its role as a test bed for 168 options, Bayles said.

Cross-Assemblers Improve PDS Runs

NASHUA, N.H. — Sanders Data Systems, Inc. (SDS) has new assembler programs for the Series 800 programmable terminal systems.

The programs execute approximately 20 times faster than the company's original DOS/360 PDS Assembler, and 10 times faster than the Sanders original OS/360 Assembler, the firm's spokesman said.

Both the new OS/360 PDS and DOS/360 PDS assemblers, designed to run on IBM 360s or 370s, enable the PDS programmer to convert assembler language source programs into machine language code compatible with the Sanders PDS terminal.

Both assemblers are free with the Sanders 804 terminals — which cost \$6,980, with a lease price of \$202 to \$245/mo — and with the 810 cluster of terminals, priced at \$3,387 per terminal and a lease range of \$94 to \$115/mo per terminal.

Sanders is at Daniel Webster Hwy., 03060.

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Data Briefs

IEEE Group to Investigate Man-Machine Interface Facts

SILVER SPRING, Md. — The IEEE Standards Committee has announced the formation of a man-machine interface subcommittee.

Designated Project P353, the IEEE Computer Society subcommittee will draft display data terminal standards for characteristics such as character size, resolution, brightness, colors, flicker rate and cursor representation.

Users interested in participating as members should contact Gerald C. Schutz, subcommittee chairman, c/o IEEE executive secretary, Box 639, 20901.

Datran Plans Switched Service

VIENNA, Va. — Datran plans to provide its first switched data services to eight cities in its projected nationwide network by early 1974.

Initial service will be provided between St. Louis and Houston with intermediate stops at Kansas City, Tulsa, Oklahoma City, Fort Worth, Dallas and Austin, Texas.

The customer terminal interface unit, which will be required to link all Datran customers to its network, will be supplied by Burroughs.

FCC Carrier Decision Appealed

SAN FRANCISCO — The FCC decision that paved the way for MCI and the other specialized carriers was challenged in the U.S. Court of Appeals here recently.

The National Association of Regulatory Utility Commissioners and the Washington Utilities and Transportation Commission told the court the FCC decision allowing the new carriers to provide service should be overturned.

In addition to the two regulatory bodies, MCI, Datran, Southern Pacific Communications Corp., the FCC, the Justice Department and other interested parties were present. A decision on the appeal is not expected for several months.

Ann Arbor Adds Keyboards

ANN ARBOR, Mich. — Ann Arbor Terminals, Inc. has announced its Series KB200 free-standing keyboards.

The Model KB200A provides a 53-key ASR33-compatible alphanumeric keyboard arrangement and generates 7-bit parallel Ascii output at TTL logic levels.

The Model KB200B is identical, except that separate cursor, numeric, and function keys are also provided.

An optional configuration, the Model KB200B-1, is intended for external synchronous applications.

Prices for the series are \$250 for the KB200A, \$300 for the KB200B and \$350 for the KB200B-1. Ann Arbor Terminals is at 6107 Jackson Road, 48103.

IBM TP Additions

Vtam Should Aid 370 User

By Ronald A. Frank
Of the CW Staff

WHITE PLAINS, N.Y. — IBM's introduction of the 3704 programmable front-end processor and the Virtual Telecommunications Access Method (Vtam) [CW, Feb. 7] has added new capabilities primarily for users of 370s.

One of the major changes allows either the 3704 or 3705 to operate remotely from the mainframe site. In these configurations a second front end must also be installed at the central site. Another capability, previously introduced by several independent front-end suppliers, lets a user operate in both emulation (270X) mode and native mode to develop applications programs. Both of these developments are available only to 370 users.

The concurrent emulation and NCP mode is achieved with the partitioned emulation programming extension of NCP/VS.

Vtam contains two major elements to direct the 3704 or 3705 processors through the Network Control Program (NCP). The first is the teleprocessing manager which logically connects and disconnects terminals from application programs. The teleprocessing manager also informs the console operator of network status, logs net data and initiates restarts.

Good Connections

The Vtam program interface connects the application programs with the teleprocessing manager. The interface executes macro instructions to direct the acquisition, reading, writing and checking of data from connected terminals. This interface also provides asynchronous processing so an application program can continue while it waits for a request to be completed.

The Telecommunications Access Method (Tcam) message control and message-processing interfaces offer queued access to Vtam for OS/VS users. This capability for applications where direct transaction-oriented processing is not required allows the program to proceed as if the entire TP network were a data set, according to IBM.

Current Tcam application programs are said to be able to utilize the Vtam/Tcam interfaces "with minimal or no coding changes."

Vtam allows the user to interface new applications into an existing network. When a user at a terminal requests a connection to an application program, Vtam indicates the log-on request, and the connection is made if the program has been conditioned to accept it. Terminals can be dynamically connected and disconnected from applications during program execution.

OS/Tcam or OS/VS Tcam are available for local 3704 or 3705 use with the NCP but remote features can be supported only with Vtam, according to IBM.

The NCP edits messages and controls their flow between the mainframe and the terminals. The 3704 and 3705 can operate with a wide variety of terminals including the 2740, 3735 and the 3270 CRT. Both the front ends will continue network handling of terminals during "short-term shutdowns" of the mainframe.

By the Numbers

Among the added features of NCP/VS are manual dial operation when automatic calling is not available, and two-channel support for multiprocessor (MP) configurations of the 158 and 168.

In an MP system, a single 3705 with two Type 2 channel adapters is attached to the two CPUs when operating under OS/VS. Another feature allows switched network backup. When a private line is down, the console operator at the front-end processor can manually call a terminal attached to an IBM 3872 or 3975 modem.

Specialized Carrier Provides 100 kBit/Sec Data Channels

DENVER — Western Telecommunications Inc. (WTIC), one of the specialized common carriers, is providing the U.S. Navy with 100 kbit/sec data channels to train its pilots in air combat techniques.

The system was developed for the Navy by Cubic Corp. and uses software simulation to indicate a hit or miss by particular weaponry.

Data of 100 kbit/sec and other circuits is furnished by WTIC to the van-type structures housing the CPUs (Control and Computation Subsystem [CCS] and the display console located at Yuma, Ariz., Marine Corps Air Station. Three Xerox Sigma 5 computers perform the major computational processing of telemetry and tracking information.

A 50 kbit/sec cable data link connects the CCS van to the Display and Debriefing Subsystem (DDS) van. One DDS visual display presents a quasi three-dimensional view of aircraft maneuvering. A second real-time video display provides timing and status information including air speeds, "G" forces, weapon selection, aircraft type and similar data. Data processing "hit" or "miss" decisions are presented to the viewing instructors.

A remote DDS console is located at the aircraft's home base, Miramar Naval Air Station in California. The 50 kbit/sec data circuits from Yuma to Miramar are transmitted on the WTIC high-capacity long-haul trunk recently authorized by the Federal Communications Commission.

The 100 kbit/sec circuit was chosen as the most effective information transfer

HIS Upgrades 58

WELLESLEY HILLS, Mass. — Honeywell has added multiple communications capabilities to its small Model 58.

The Multiworkstation system allows the use of up to four terminals for remote or local information retrieval, inquiry and data entry.

The system combines an asynchronous multiline controller with Honeywell's DOS II to allow multistation routings and batch processing.

The multiline communications controller is designated the MLC050 and uses 8-bit Ascii code at speeds up to 1,200 bit/sec. Manual or auto answer can be used and the system is compatible with standard RS 232C interface modems.

To support a multiworkstation configuration, the user must have a Model 58 with 10K of storage, a DSS 058 disk subsystem with 5.76M bytes, a 100 card/min reader, 100 line/min printer, terminals and the MLC050 controller.

The controller will be available in the second quarter of 1973 for \$12,000 or \$285/mo.

ICA Finalizes Plans For Boston Meeting

BOSTON — The 26th annual conference and exposition of the International Communications Association (ICA) will be held at the Sheraton-Boston, May 14-17.

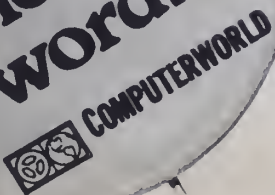
Dr. Jerome B. Wiesner, of the Massachusetts Institute of Technology, will deliver a speech titled "Human Communications" and Sebastian A. Lasher of the Office of Telecommunications Policy will speak on "The Functions and Policies of OTP."

Other scheduled speakers and topics include D.E. Gourley, vice-president of marketing, Datran, on "Data Communications" and R.A. Kuehn, president of RAK Associates, on "Communication Management — Is It Possible?"

An international carriers panel and a panel on domestic satellites are also scheduled.

Information is available from J.D. Martin Jr., National Steel Corp., 700 Chatham Center, Pittsburgh, Pa. 15219.

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For variety of reasons, IBM has dominated the EDP systems industry in a way that is almost unheard of in American business, except for publicly granted monopolies. But there are alternatives to the big boy. And that's what our March 28th Supplement is all about: *The Non-IBM World*.

Edited by *Computerworld's* Mike Weinstein, this study will include a look at the state of the industry, and a report on seven of IBM's competitors. Each of these companies — from Honeywell to Xerox Data Systems, has its own personality and its own place in the market. We'll be looking at their history, what they offer and where they stand. We'll also get opinions from their users, and try to create a picture of each one's strengths and weaknesses — to give

you a clear idea of where it's at.

If you're a user who wants to look past IBM's looming frame, then our March 28th Supplement is the place to start. And if you're a marketer who wants to talk to the people who run this industry, your ad should be there when *The Non-IBM World* goes out. The supplement closes on March 9th. For details, just contact the nearest Computerworld Representative: *Boston*, Bob Ziegel, (617) 332-5606. *New York*, Don Fagan (212) 594-5644. *Los Angeles*, Bob Byrne (213) 477-4208. *San Francisco*, Bill Healey (415) 362-8547. Or write to: Judy Milford, Computerworld, 797 Washington Street, Newton, Mass. 02160.

Certification Said to Hurt Users

DETROIT — A certification program that would allow direct connection of approved non-carrier equipment to the phone network would benefit a few users only, according to AT&T board chairman John D. DeButts.

Speaking before the Detroit Economic Club, DeButts described AT&T's "deep concern about the long term consequences" that would result from a certification program.

The average customer will "sooner or later" have to pick up the "revenue requirements" no longer met by customers who install their own terminal gear, DeButts said.

Important questions still remain to be answered about certification, the AT&T chief said. One of these is whether the maintenance of customer-owned equipment can be effectively certified.

In the area of interstate private line competition, AT&T will soon announce details of its two-level rates

that will allow it to take "advantage of the economies of scale" of high-capacity routes, DeButts said.

The dual rates will be the first departure from Bell's traditional nationwide average pricing, and will provide proof of AT&T's "intention to compete and compete hard."

Competition in the private line area by the specialized carriers will bring some advantages to "particular users" but this will be done at the expense of the general body of telephone users.

The widest availability of high quality communications at lowest over-all cost will be impaired "in some measure" by the duplication of facilities and division of responsibility that will result from competition, DeButts said.

AT&T is concerned about the recent FCC decision that restricts Bell from using satellites for private line services for three years, the AT&T chairman said.

'Boss' Links Sanders 800, 360s

NASHUA, N.H. — Sanders Data Systems Inc. has added the Boss software packages to its 800 series programmable display packages.

The Boss packages provide the Sanders displays with more hardware and editing features than the comparable IBM 2260 and 2265 systems and at lower cost, the company said.

The software allows the Sanders 804 stand alone and 810 cluster systems to communicate with IBM 360/370 systems in local or remote mode. It provides printing speeds of 30 or 165 char./sec and 110 or 200 line/min; transmission speeds to 9,600 bit/sec; and more editing capabilities with "little or no impact" on the 2260 software.

The Boss software supports optional features of upper and lower case characters, 1,920-char. screen capacity, insert/delete line or character, blink field, back tab and erase to end of field, line or screen.

With the Sanders 731 remote communications controller, Boss allows either

synchronous or asynchronous transmission from 1,200 to 9,600 bit/sec. When directly attached to the IBM byte multiplexer channel via the Sanders local channel adapter, transmission speeds up to 50 kbit/sec are possible, the firm said.

Extended Boss employs Ascii line discipline and IBM 2265 system commands in providing the Sanders 804 terminal with many of the editing and validation features offered on the Sanders 620 and 720, as well as the IBM 3270, Sanders claimed.

Both Boss and Extended Boss are free with the 804 stand alone terminal which costs \$6,980 or a lease range of \$202 to \$245/mo.

Boss and Boss Local are free with the 810 cluster of eight terminals, with prices starting at \$3,387/terminal or a lease range of \$94 to \$115/mo/terminal. Sanders Data Systems is at Daniel Webster Highway, 03060.

Australian Bank Installs Honeywell On-Line Data Net

SYDNEY, Australia — The Commercial Banking Company of Sydney Limited (CBC) has installed a Honeywell 6040 computer here as the first phase of its on-line banking system. The computer will be linked to three Honeywell 316 minicomputer satellite systems. Initially these will handle communications to terminals in 104 of the bank's 500 branches.

CBC is using Honeywell's Integrated Data Store data base management system (IDS) to develop a banking system employing customer numbers, rather than separate account numbers, as the basis for all its customer accounting procedures.

"Under this system each customer has only one number, even if he has five or more different accounts with the bank," explained D.J. Smith, administrative officer for automation at CBC.

"The customer number gives the bank a profile of all dealings it has with the customer. This has advantages from the systems angle in that it avoids repetition of information — in marked contrast with account number systems, where a customer's name and address, for example, has to be repeated in the records for each account."

Bank officials can access and immediately update customer accounts through terminals at each bank branch. The computer also will process current accounts, savings accounts, installment loans, savings bank housing loans and master general ledger applications.

The 6040 computer has a 96K-word main memory, a 304M disk storage subsystem, eight magnetic tape units, a card reader and line printer. The three minicomputers in the system, in addition to handling communications, will control the transfer of check data from two Honeywell document reader/sorters and data from visual information projection units.

Delta Data APL Terminal Has 3,000-Char. Memory

WASHINGTON, D.C. — A new APL terminal was added to the Delta Data Systems 5000 family of computer terminals at the Computer Caravan/73 here last week.

The Model 5260 is an Ascii-oriented APL terminal featuring a 96-character set which includes all APL characters and an overstrike capability.

The CRT terminal can display 27 80-character lines at one time and has the ability to store more lines in a "paging memory." Up to 3,000 characters of information can be stored in the buffer at the terminal site.

The average terminal costs \$4,500 and leases for \$205/mo on a one-year plan or \$170/mo on a three-year plan including maintenance.

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Bits & Pieces

Terminal Works in On- And Off-Line Modes

SUNNYVALE, Calif. — The Dicom 345 Cassette Magnetic Tape Terminal is designed for both on-line and off-line applications.

In its on-line mode, the CMTT ties in directly with most major minicomputers; as an off-line device, it permits serial modem-to-modem communications at transfer rates of 110 bit/sec and 300 bit/sec (10- and 30 char./sec).

On-line use of the CMTT with computers manufactured by Hewlett-Packard, Varian, Data General and Digital Equipment Corp. is supported by a library of cassette operating system software and "off-the-shelf" interfaces.

Single unit price is \$3,300 from 715 N. Pastoria Ave., 94086.

... Building a Calculator System

CAMBRIDGE, Mass. — The IW-770 is a fully automated punched card reader that plugs into the I/O connector of Wang 600 and 700 Series programmable calculators, according to the developer, Digital Laboratories.

The reader handles up to 200 card/min and allows stacks of up to 500 cards to be processed without operator intervention.

Any field in the card may be addressed directly, eliminating the need of bringing unnecessary data into the calculator, a spokesman said.

Price of the card reader is \$3,850 from 377 Putnam Ave., 02139.

WCS With ID-70 Equals Real-Time

HAWTHORNE, Calif. — The ID-70 Omnirom from Memory Systems, Inc. is a plug-compatible Writable Control Store (WCS) designed for Interdata Model 70 minicomputers.

Using the ID-70, the sophisticated user can, under keyboard and software control, modify all or part of the command structure of his Model 70, including real-time applications, the firm said.

Omnirom is priced at \$4,298 for the 1K unit and \$5,500 for the 2K version from 3341 W. El Segundo Blvd., 90250.

Unit Takes 'Drawl' out of TI 980A

PORTLAND, Ore. — Users of the Texas Instruments 980A computer can attach a floating-point auxiliary processor for "faster than normal" execution of Fortran and Assembly Language programs, according to a spokesman for Floating Point Systems, Inc.

The add-on processor — utilizing the 980A's auxiliary processor port — operates as though it were a part of the main central processor, performing floating-point add, subtract, divide, multiply, fix and float.

Cost of the companion processor is \$16,000 from 3160 S.W. 87th Ave., 97225.

Recording--Part I

Physical Process Employs Flux Change

By John C. Scott

Special to Computerworld

Despite the fact that most users are constantly worrying about potential disk problems, few adequately understand disk operation to determine a positive course of equipment evaluation or areas of potential trouble.

As for their architecture, disks are made of aluminum substrates approximately 14 inches in diameter onto which is bonded

Many users lack knowledge of how the hardware within their computer systems operates. A basic understanding of the principles of operation of central processors and peripherals can enable improved selection, troubleshooting and utilization.

This first part of a series on magnetic disks deals with recording and explains how information is written onto and read from disk surfaces.

a magnetic medium with recording characteristics similar to those on magnetic tape.

Electromagnetic transducers known as "heads" are used to write data onto and read data from the disk surfaces.

In operation, disks rotate at typical speeds of 2,400 rpm and 3,600 rpm, and the heads aerodynamically fly over each surface making no direct contact. The flying height of heads above the disk is in the 50 μ m. to 150 μ m. range.

Each head contains a core of magnetic material separated by an air gap directly over the disk surface.

When a current is passed through the coils wrapped around the core, the induced magnetic field magnetizes the local disk surface area.

Thus data is recorded on the surface by controlling the flow of current applied to the head coils.

Recording and Reading Information

Binary information from the CPU arrives at the drive controller in a variety of forms, usually parallel by bit. However, it is recorded on the disk pack in bit serial form.

Thus, the binary information (e.g. 101100) must be encoded or translated into a form suitable for disk storage.

Since the physical mechanism employed in data recording is flux change with respect to time, there must be two information channels: one which is sensitive to flux change timing variations — i.e., a clock; and the channel containing the binary information which has been encoded into variable-length magnetic flux changes.

In the normal process of recording, the encoded binary information controls a write current driver causing current to pass through the head coils.

This, in turn, creates a flux path in the

core whose magnitude and direction depend on the current amplitude and polarity. If the magnetic flux is strong enough, saturated magnetic recording takes place.

If the disk is then removed, it contains a series of magnetic transitions recorded on concentric tracks.

These transitions in themselves are meaningless from an information point of view. They require a second information channel, the clock, to have any real meaning.

On readback, the magnetic transitions

Disks: Nothing But the Truth

pass beneath the head and induce a voltage pulse proportional to the speed and the magnetic pattern on the disk.

Since disk packs are designed for volume production, reasonable tolerances must be allowed on all parts. Therefore,

through design and cost constraints it is unreasonable to require that the clock and magnetic transitions always occur precisely on time.

Consequently, systems have a window or capture range on either side of nominal clock position. If a magnetic transition falls within this window, it is interpreted and decoded as a "1."

If an error occurs, there probably has been a peak shift from the expected position on the disk, or the amplitude of the playback signal is too low to permit detection.

Basically, errors are caused by non-uniformity in the coating which causes local variation in magnetic field strength and subsequent distortion of recorded transitions.

John C. Scott is director of technical development for Computest Corp. in Cherry Hill, N.J., specializing in computer test equipment.

Advice to Users Shopping Around: 'Don't Buy DP by Committee'

By Michael Weinstein

Of the CW Staff

BOSTON — "Make one person responsible and have him follow some basic steps" is Dave Tierney's advice on computer hardware selection.

Tierney, who advises State Street Bank of Boston on equipment, is against choosing equipment by committee.

"Unless one person is responsible, no one is responsible," he stated, "either for collecting the proper data or for committing to choices."

Once a person is designated as responsible, Tierney suggested some basic steps to follow — from defining the operational needs to recommending and accepting the chosen equipment.

"In defining the type of equipment needed, the primary source is the people who must use it. Ask what is the work objective that the equipment is to aid," he stated.

If users would determine their needs from internal objectives, they would avoid the major pitfall of equipment procurement: the salesman telling users what they need.

After deciding what the equipment must do, Tierney advised, "users should investigate vendors who have potentially suitable equipment."

From this investigation users should choose all vendors who possibly could fit their needs and submit a proposal to each.

Use a grid system to evaluate returning proposals, he suggested — across the top, list the characteristics the user needs for

his working objective, down the side, list the names of the responding bidders.

In this matrix, users should evaluate how each piece of equipment appears to fill the original objective by giving it a value from one to five.

From the evaluation, Tierney recommended that users pick two — the primary choice and a backup.

Check the financial status of each of these and ask each for a current user list.

"Beware of vendors who will not give you this list," he cautioned, "as in almost all cases it means they have something to hide."

In calling the users of the prospective vendors' equipment ask for the date of delivery, whether there were any delays in installation; why the previous system was replaced; what is the new end result in throughput and cost; what are reliability and service like; and if they had to do it over, whether they would choose the same vendor.

Satisfied with the vendors' general equipment and service, users should have them perform benchmarks on the actual task they want the equipment to perform. For example, "if they say that their terminal is compatible with your configuration, ask them to plug it in and test your operations before you buy," he advised.

Finally, after users have determined their choices, they should document their steps in selection for presentation to management.

This final step is many times crucial since it stops vendors from going over the DP selector's head and trying to make a management sale, he advised.



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New OEM Products

Analyzer Allows 5-Second Testing

CONCORD, Calif. — Data Test Corp. has a new version of its Datatester 4000 semiautomatic digital circuit analyzer to test and troubleshoot digital logic boards.

The Datatester 4000A-60 digitally registers the number of logic transitions through a circuit under test at each output by introducing a series of nonsynchronous (Grey Code) square waves to all its inputs.

The maximum time required per test is five seconds, the firm said. No programming is needed to verify every combination of the I/O logic or truth tables for complex logic circuits.

Consisting of two modules, the unit costs \$4,340 from 822 Challenge Drive, 94520.

System Can Test Semiconductor Memories

NEWPORT BEACH, Calif. — Western Digital Corp. is offering the Spartan 770 "Bit Rider" LSI Test System for testing semiconductor memories.

The "Bit Rider" includes 32 memory channels, 15 drivers and a high-speed, 10 μ A resolution comparator. The unit offers 1 nsec timing resolution. A microprogrammable RAM memory allows for test-pattern storage and pattern generation at 5 MHz to test efficiently both recursive and random logic circuits, the firm noted. The built-in controller eliminates the necessity of a computer for basic testing although a PDP-11 option allows data logging, characterization and multiple programs to be run with the Spartalk software packages.

The price of the "Bit Rider" is \$59,770. The firm is at 19242 Red Hill Ave., 92663.

Keyswitch Allows Manual Entry of Commands

HERKIMER, N.Y. — A "pancake" fast-make/fast-break keyswitch has been introduced by Mohawk Data Sciences Corp.

The Type S Signal Keyswitch, which provides manual entry of commands into systems using DTL, TTL or MOS circuit logic is available only as mounted arrays on a common printed-circuit board.

Typical per-key cost ranges from 21 cents to 29 cents mounted on the customer's board; push-pull alternate-action is an additional 10 cents to 12 cents/keystation. Delivery is 10 to 12 weeks.

Paper Tape Handler Used With Any Reader

HACKENSACK, N.J. — The Model 3300 paper tape handler from Data Peripheral Inc., operates bidirectionally at speeds up to 600 char./sec (60 in./sec) with any reader.

Photoelectric (LED) solid-state switches sense tape requirements and triac control spooling motors.

End of tape and broken tape will shut off the spooler. Two 7-1/2 in. diameter spools are supplied.

Unit price is \$350. OEM sales in 100 quantity lots are \$280 each from 14 Porter St., 07601.

9K Bit ROM Offers 120 Nsec Access Time

SUNNYVALE, Calif. — Monolithic Memories, Inc. has added the MM5260/6260 9,216 bit ROM to its line of read-only memories.

The device is organized as 1,024 by 9, offers 120-nsec access time and may be ordered as a 7 by 9 font character generator.

The 9K ROM is packaged in a 24-pin ceramic DIP and is priced at \$65 in 100 lots from 1165 E. Arques Ave., 94086.

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All Attendees Welcome At Afternoon Sessions

Day 1: Hoxie Hits New 'Commo' Lingo

Data Communications jargon is expanding rapidly as technological developments bring new facilities and devices to the marketplace, says consultant Gilbert H. "Gib" Hoxie.

However, he has found that certain often neglected management aspects of data communications planning usually tend to outweigh esoteric technical factors.

Hoxie, a manager in the Information Systems Division of Booz, Allen & Hamilton, Inc., addresses the topic of Data Communications Planning on the opening day of the Computer Caravan.

He believes systems planners intending to install or expand data communications applications would be wise to include a "wide range of management considerations" in their analysis.

Answers to the nine questions below may be "key to designing the right system," Hoxie adds.

1. What information systems do we have (need) and why?
2. Which applications require data communications?
3. How well do alternative data communications systems satisfy requirements?
4. What will be the true one-time and operational cost?
5. What will be the true one-time and operations benefits?
6. What will be the impact on users and work-flows?
7. Who are the vendors, and what are they selling?
9. What techniques are most effective in selecting and presenting the best design?

Hoxie attempts to answer these questions during a tutorial on Data Communications Planning, given at 2:30 P.M. on opening day of the Computer Caravan. The open, general session may be attended by

people wearing any Computer Caravan badge, i.e. exhibitor, exhibitor-guest, exhibits-only, or Forum program for any day.

Although the presentation will last about an hour, it is anticipated that attendees will have questions for Hoxie.

Beware; Intangible Benefit

Hoxie does not believe in "intangible benefits" of systems, or at least not during the process of cost justification.

"If an analyst can't hang a number, or range of numbers on a 'benefit,' he has no business citing it even as partial justification for a system," he remarks.

"Intangible benefits," which he regards as one of the "major pitfalls for systems planners," only represent "snares and delusions for the individual who must select an alternative, and he is bound to come out on the wrong end of any ensuing conflict," according to Hoxie.

He thus advises that "80% to 90% of intangible benefits can be quantified and user commitments obtained. Those that can't be defined and sized, usually are excluded from the benefits analysis and if they appear in a report at all, are downplayed."

Hoxie's speech is an addition to the Caravan program, in that any Caravan attendee is eligible for admission; it actually sets the stage for the middle-day Forum program, which is devoted to management and operational considerations of data communications.

Last year, three "keynote" speakers toured the country with the Computer Caravan, but the time for these speeches has been given over for extended panel discussions and workshops, a direct result of feedback from the users

President's Message



The basic concept of the Computer Caravan is: a national computer conference that travels to you, the computer user.

The fact that the people staffing the exhibit booths are, for the most part, local sales representatives will be appreciated by all those who visit the exhibit. These representatives of DP suppliers will still be here, long after the Caravan has departed.

The idea of tailoring a national conference to the needs of local users is carried to a higher degree by some of the individual exhibitors, who have planned special seminars oriented towards their particular product or service.

Attendees at last year's Caravan said they liked this type of individualized presentation, and more exhibitors have responded by scheduling these seminars.

Whether your main interest is in hardware, software, or services, the leading companies in each sector of the EDP industry are found in our exhibit hall. Both their sales and their technical personnel are prepared for your probing questions on their products, many of which are being introduced on the Caravan, while others are already proven in the field.

Your comments on our program are welcome. Feel free to note your suggestions with *Computerworld* representatives on the exhibit floor, or in the *Computerworld* booth. We are here to serve you; please tell us how we may best accomplish that goal.

Patrick J. McGovern
President, Computerworld, Inc.

Day 2: Panel Probes Software Sources

The Software Evaluation panel is one of three "open" sessions that take place during the afternoons of the Computer Caravan.

These sessions may be attended by people wearing any caravan badge, such as exhibitor, guest, exhibits only, etc.

The Software Evaluation panel is aimed at examining various sources for applications and utility software; paraphrased, it is a "make-or-buy" round-table discussion, and the audience will be invited to take part.

In general, panelists will follow the outline below. If time permits, questions of a broader nature will be entertained.

- I. Evaluating the alternatives
 - Where do you start
 - The main criteria, how to weigh them
 - When you have done enough looking?
- II. Pricing, measuring techniques (this relates to first topic, but might be more specific as to cost/CPU time/volume of reports, etc.)

(Continued on S/Page 5)

Day 3: Small Systems Described by Users

Small businesses with computers and businesses with small computers are not necessarily identical, but they will be sharing the stage during our Small Systems panel, on the afternoon (2:30) of the final day.

This panel is designed to give a broad overview of the types of systems available, and the problems and opportunities presented by these computers.

In many instances, such systems are chosen by company presidents with little or no DP experience; in other cases, on-line systems may be operated by clerical personnel.

In all cases, it appears small computers are proliferating the business community at an unprecedented rate, and this panel session attempts to take a snapshot of local small-computer usage today.

Again, panelists will be following the outline below, and any questions of a broader nature will be taken, if time permits.

I. Planning

- Discovering the need (growth; new business;

(Continued on S/Page 5)

Many Titles Suit DP Conferences

Few generalities can be applied to the Computer Caravan, with one possible exception: computer conferences are many things to many people.

The 1973 edition of *Computerworld's* traveling show is the distillation of user and exhibitor recommendations after our 1972 debut; most people approved of the local concept, since it afforded them an opportunity to speak with users and DP suppliers from their own region.

This has remained unchanged.

Again, local and regional users comprise the panel discussions and will be leading workshops.

Again, local sales and technical representatives will be staffing the booths in the exhibit hall.

The Computer Caravan, then, is a management conference with a program geared to increasing the operational efficiency of computer centers.

It is a business exposition, with the latest in computer hardware, software and services on display.

It is a showroom for exhibitors,
(Continued on S/Page 6)

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- ☐ Information available from the Control, DATA, and XREF portions of RDAM records.
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- ☐ Processes a virtually unlimited number of strings through the data base.
- ☐ Reads initial driving file in a string either directly or sequentially. All other reads are direct.
- ☐ Direct reads can be based on keys submitted by user and/or keys read from a non-RDMS file.
- ☐ Chaining across files through XREF entries handled automatically by the system.
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- ☐ Includes all features listed under CULPRIT sections.

TOTAL/CULPRIT

- ☐ Information available from the entire TOTAL record including root and linkage segments.
- ☐ Employs a cataloging feature eliminating the need to define logical fields in report parameter cards.
- ☐ Processes a virtually unlimited number of strings through the data base. Each string may be several files long.
- ☐ Reads initial driving file in a string either directly or sequentially. All other reads are direct.
- ☐ Direct reads can be based on keys submitted by users and/or keys read from a non-TOTAL file.
- ☐ Linking between files and reading of variable chains handled automatically by the system.
- ☐ Handles multiple linkages between a master and/or variable file (e.g., Bill of Materials organization).
- ☐ Access all types of files.
- ☐ Includes all features listed under CULPRIT section.

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Cullinane Corporation

One Boston Place, Boston, Massachusetts 02108. Telephone (617) 742-8656.

Exhibitors Set Special Seminars

The following exhibitors will be sponsoring seminars in the various cities visited by the Caravan. Consult the table below for times and cities. Check with individual exhibitors for exact topics in each city and availability of space.

| | Boston | Washington, D.C. | New York | Atlanta | Houston | Anaheim | San Francisco | Kansas City | Chicago | Cleveland |
|-----------------------------|--|------------------|----------|---------|---------|---------|---------------|-------------|---------|-----------|
| DAY 1 | | | | | | | | | | |
| 2:30 p.m. | | | | | | | | | | |
| Iomec | * | * | * | * | * | * | * | * | * | * |
| 4:00 p.m. | | | | | | | | | | |
| Sycor | * | * | * | * | * | * | * | * | * | * |
| DAY 2 | | | | | | | | | | |
| 2:30 p.m. | | | | | | | | | | |
| Iomec | * | * | * | * | * | * | * | * | * | * |
| Interdata | * | * | * | * | * | * | * | * | * | * |
| ICC | * | * | * | * | * | * | * | * | * | * |
| Varian* | * | * | * | * | * | * | * | * | * | * |
| 3:30 p.m. | | | | | | | | | | |
| Tektronix | | | * | * | | | | * | * | |
| Varian* | | * | * | * | | * | | * | | * |
| 4:00 p.m. | | | | | | | | | | |
| Cullinane | * | * | * | * | * | * | * | * | * | * |
| Infotron | * | * | * | * | * | * | * | * | * | * |
| 4:30 p.m. | | | | | | | | | | |
| Varian* | * | | | | | | | | | |
| DAY 3 | | | | | | | | | | |
| 4:00 p.m. | | | | | | | | | | |
| Western Union Data Services | * (may run in all cities based on Boston interest) | | | | | | | | | |
| BCS | | | | * | | | | | | |

*By invitation only.

**Need
Minicomputer
application
data
?**

GET IT IN WRITING AT CINCINNATI MILACRON

When you visit the Cincinnati Milacron exhibit at the Computer Caravan, we won't just talk mini-computer capability . . . you'll get it in writing. Application specialists will be there to help you with your specific needs . . . they'll be able to tell you what's needed, how it will work and what it will provide. They'll be backed up by a mini-computer system that will provide component and unit pricing . . . in writing. If you want specific application information, you'll get it at Cincinnati Milacron . . . in writing. Process Controls Division, Cincinnati Milacron, Lebanon, Ohio 45036.

minicomputers



Caravan Staff

From the several offices of the vast *Computerworld* organization comes the staff that has supported and is now conducting the Computer Caravan.

This staff is composed of former show people, current industry figures and sales experts, editorial people, and the all-important registration and office personnel.

The variety in their backgrounds is too detailed for presentation here, especially since all are full-time computer-conference specialists for late Winter and early Spring 1973.

The hundreds of hours of extra work, weeks and months of travel, and the valuable experience during all this hectic activity both this year and in 1972, are all reflected in a bigger Exposition and a more comprehensive Forum program for Computer Caravan/73.

Here are the people that are making it all possible. A special message from the Publisher and Caravan President is found on page 2. Special acknowledgement goes to Leslie Flanagan, who did all this photography work; not pictured is Bob Rankin, caravan manager, who was on the road during the entire time that this section of the Caravan Supplement was being "put to bed."



Neal Wilder
exhibit sales
manager



Dottie Travis
exhibit sales
administrator



Ed Bride
forum manager



John Meade
caravan activity
coordinator



Leo Bowser
caravan manager



Edward "Ted" Bloom
registration director



Tamar Shapiro
asst. registration
director



Frani Blackler
caravan secretary



Linda Collins
caravan secretary



Beverly Butters
caravan secretary

Day 2: Panel Probes Software Sources

(Continued from S/Page 2)

III. What-if (recovery techniques)

- How to recover, in various situations. What if the system does not respond to your normal procedures?
- Examining your sources of ap-

plications and utilities, in light of expected problems (cost/performance again)

- (1) Cost of failures
- (2) Expertise (how to retain or keep good software people or suppliers)
- (3) What have your colleagues done?

IV. Next step?

- Your growth, and how it could affect software selection
- Impact of hardware changes on software sources
- Stability of the source (manufacturer, software house, etc.)

Day 3: Small Systems Described by Users

(Continued from S/Page 2)

- costs, etc)
- Vendor proposals (how you evaluated them)
- Procurement

(1) Problems unique to small businesses

(2) Financial peculiarities (contract flexibility, etc)

II. Operation

• Most common problems vs. chief advantages

(1) Who solves what kinds of problems, why?

(2) As a class, how does the equipment work

• New Applications

(1) Who develops, maintains

(2) Upgrades to larger configuration vs additional small systems

• Optional items

(1) Independent peripherals and supplies

(2) Independent software

(3) Vendor vs in-house training.

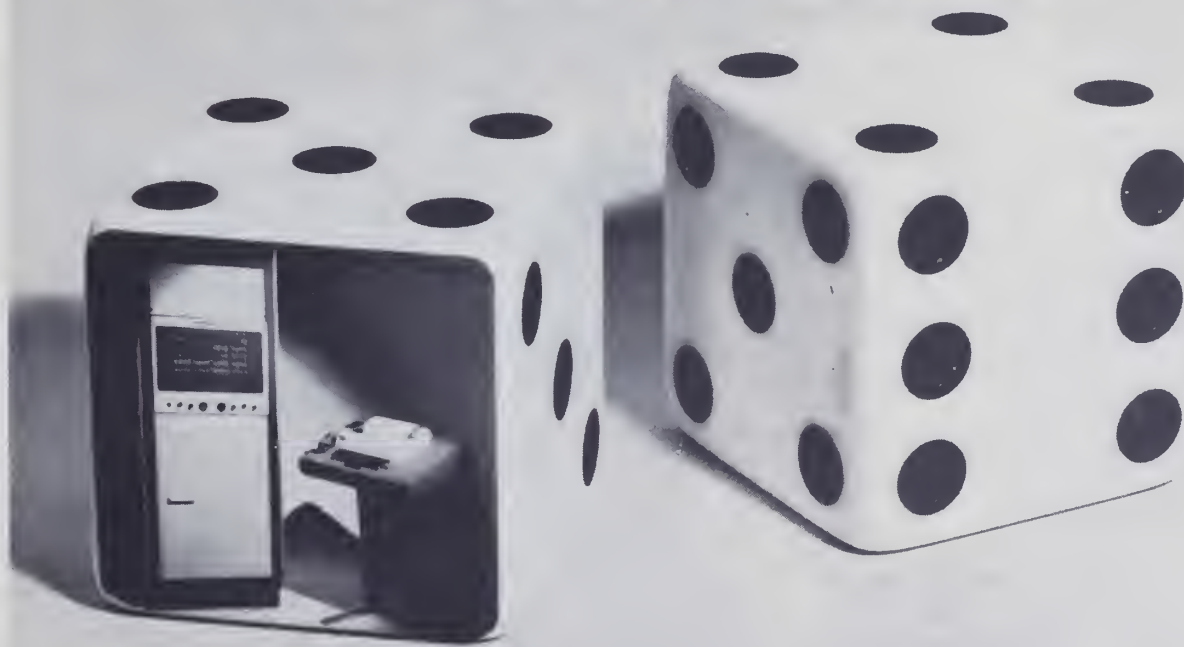
III. Review

• "What could we have changed, to make it better?"

• How does a small business look back on a computer procurement?

10% OFF THE PURCHASE PRICE* IF YOU CAN...

BEAT THE SYSTEMS



The SYSTEMS 72 computer, that is. It's programmed to shoot craps with you in our booth at the Computer Caravan, and the stakes are pretty impressive.

Like, 10% OFF THE PURCHASE PRICE OF A SYSTEMS 72 if you can run your winnings up to \$1,500. We start you off with \$500 "credit."

Just to keep our 72 from getting bored, we'll be running FORTRAN, BASIC, and batch on it at the same time it's shooting craps. That's only typical of the power and versatility of the 72, the first small virtual-memory computer. It combines the advanced problem-solving capabilities of much larger computers with the ease of operation and economy of minicomputers.

The SYSTEMS 72 features:

- time-sharing □ virtual memory
- reentrant FORTRAN/BASIC
- multiprocessing □ all processors available to users console simultaneously.

So don't crap out. You've got plenty to gain for your company. And nothing to lose. Come on in and BEAT THE SYSTEMS.

If you can't make it to the show, write for our SYSTEMS 72 brochure, SYSTEMS Engineering Laboratories, 6901 W. Sunrise Boulevard, Fort Lauderdale, Florida 33313.

*Discount limited to one per company. Void where prohibited by law.

SYSTEMS
ENGINEERING LABORATORIES

Many Titles Suit DP Conferences

(Continued from S/Page 2)

who have invited people who they know might be interested in a certain facet of computer technology, or in certain products.

It is also a learning experience, not only in the regular Forum program, but also because of the special exhibitor seminars, where potential customers can learn about equipment capabilities and selection criteria.

So the Computer Caravan/73 is indeed many things to many people, but we don't have to stop there. Through your valuable feedback, either through Forum evaluation forms or face-to-face contact with us, we can plan the 1974 program to fill a broader spectrum of needs.

Exhibitor Listings

The following is an alphabetical listing of exhibitors in the 1973 Computer Caravan, and a brief description of the products and services to be displayed.

AMERICAN TELEPHONE & TELEGRAPH COMPANY
680 Fifth Avenue
New York, N.Y. 10019
Tel: (212) 393-2101

The visitor to the Computer Caravan/73 can see the highlights of the Bell System's approach to moving data. AT&T will feature the high-speed "dataphone 4800," first in a new family of data sets from the Bell System. The 4800 data set was designed for economical transmission at 4800 b.p.s over basic uncon-

ditioned private line facilities.

Also on display will be the Bell System's 85 A-1 Selective Calling System for polling applications. The system is a quiet, efficient way of information movement, generating management advice and systems reports in real time.

AMPEX COMPUTER PRODUCTS DIVISION
13031 W. Jefferson Blvd.
Marina del Rey, Calif. 90291
Tel: (213) 831-8933

Complete semiconductor, core, tape and disk system as plug-to-plug replacements for IBM 370 and 360 Computers, Univac 400 and 1100 computers and memories for DEC PDP-10 computers. Features will be the unique Ampex two-in-one TM-34 for 360 and 370 com-

puters — two 3420 replacement tape drives in one cabinet that reduces space requirements by nearly 50%. The Ampex DS-330 disk subsystem, a plug-interchangeable replacement for either the 3330 or 3333.

Information will also be available on the complete line of Ampex mainframe memories for IBM 370/360, Univac, and DEC computers.

ANDERSON JACOBSON, INC.
1065 Morse Avenue
Sunnyvale, Calif. 94086
Tel: (408) 734-4030

Since its beginning in early 1967 as a manufacturer of one of the first acoustic data couplers, Anderson Jacobson, Inc. has continued to develop products for the data communications and computer terminals markets. At the present time the data communications products include a variety of 150 BAUD, 300 BAUD, 450 BAUD modems and acoustic couplers as well as a 1200 BAUD which is believed to be the only one of its kind in production today. These modems and couplers are available as stand alone units, as building blocks for a multiple modem system or as basic units for OEM applications.

The computer terminal line grew out of an early product wherein an acoustic coupler was designed to become an integral part of a teletype machine. This type of terminal with certain improvements and modifications is still in production today. In addition, an auto-answer version is the AJ841 which is based on a proprietary design that utilizes the heavy duty IBM Selectric mechanism as a printer. The third basic product of this line is a new model, the AJ630 which is a 30 character per second, non-impact printer terminal.

Anderson Jacobson maintains sales and service offices in principle cities throughout the country.

AUERBACH PUBLISHERS INC.
121 North Broad Street
Philadelphia, Pa. 19107
Tel: (215) 491-8212

AUERBACH Publishers is introducing its new DATA PROCESSING MANUAL during the Caravan with a special pre-publication subscription offer. This new service provides practical advice, techniques, checklists and other aids for helping DP managers solve their daily operating and managing problems. It comes in portfolio format for easy filing and reference. Also on display is the complete line of AUERBACH Computer Technology Reports, the encyclopedic standard reference for the EDP industry. These services provide all the facts, prices, performance data, configurations and technology background analysts need to make meaningful evaluations and selections of equipment or services. Professional reference books in the fields of computer

Ampex gives you more than you asked for... again

Ampex' newest space saver...the 3420-compatible two-in-one tape subsystem for 360 and 370 computers

The biggest news since Ampex pioneered tape recording is the new two-in-one configuration for the Ampex TC-38/TM-34 tape subsystem. Now you can reduce the amount of space for tape drives and controllers in your DP center by nearly 50%... or double the number of drives without allocating more space. You can get two high performance 3420-compatible tape drives with data rates to 200 KB, in a single cabinet only a little larger than one individually mounted tape drive. It's such a logical idea, it's amazing no one thought of it before.

But space reduction is only the beginning. The auto-thread on the TM-34 now is equipped with an exclusive "halo of air" that vastly improves threading without the reel-surround cartridge. The tape will literally thread itself from any position. Furthermore, the TM-34 has an automatic reel latch that forever eliminates manually operated locking levers or buttons. And, of course, this drive has a radial interface for operation with either the Ampex TC-38 or the IBM 3803 controller.

Format configurations include any combination of 9-track, single or dual density, and 7-track with data rates from 60 to 200 KB.

If you want extra value with every peripheral product, call your Ampex Computer Specialist today. He can solve your space and budget problems with disk drives and memory enhancements, too.

AMPEX

AMPEX COMPUTER PRODUCTS DIVISION
13031 West Jefferson Boulevard
Marina del Rey, Ca 90291, (213) 821-8933



People who really know computer tape know BASF Endura.



Airlines people. University professors. Insurance people. Engineers. International bankers. They're all buying BASF/Endura computer tape.

Frankly this new product has gained incredible acceptance.

We knew the world was ready for a tape that could meet future 3200/6400FCI expectations as well as today's...and Endura's success has proved we were right.

Of course everybody has their own reasons for buying Endura. Some like its durability. Others find it puts less wear and tear on their tape heads. Others are impressed with Endura's remarkably error-free performance —



especially when they see the long term price savings.

All over the country, Endura's gaining acceptance with people who really *know* computer technology.

If you haven't already tried it, your BASF representative can give you some good reasons why you should. Talk to him. And get all the facts on our full line of magnetic media products.

BASF SYSTEMS
Division of BASF Wyandotte Corporation

Crosby Dr., Bedford, MA 01730.



BASF for people who really know.

science, data processing and management science are also on display and can be examined at your leisure.

BASF SYSTEMS
Crosby Drive
Bedford, Mass. 01730
Tel: (617) 271-4000

BASF Systems, the world's leading media supplier, will display its complete line of computer tapes, including the new BASF/endura, and the premium BASF/2000 A.D., as well as its full line of disk packs.

BASF's 2000 A.D. uses a new 'Hotter' oxide and a new thinner, harder coating for those applications requiring premium quality which exceeds industry standards.

BASF/endura offers computer users optimum prize/performance at low initial cost. Both tapes meet not only today's transport requirements, but future 3200 bpi - 6400 FCI expectations as well.

BASF disk packs are fully compatible with most major computer equipment.

On display will be the new 1236 (3336 compatible), the 1112 (200 tracks per inch 2316), the 'FLOPPY DISK,' and a full line of compatible disk packs.

BOEING COMPUTER SERVICES, INC.
P. O. Box 708
Dover, N.J. 07801
Tel: (201) 361-2121

BCS offers comprehensive support with product lines that include computer time, programming, consulting, training, data base services; applications that include general business and financial systems, scientific and engineering techniques, management and computer operating systems.

BCS operates from 24 sales offices located throughout the United States. Data Centers are maintained at Seattle, Philadelphia, Wichita, Huntsville and Washington, D.C. with over \$100,000,000 worth of equipment on order to provide maximum computer flexibility.

CAMBRIDGE MEMORIES, INC.
969 Virginia Road
Concord, Mass. 01742
Tel: (617) 259-9880

Cambridge Memories, with headquarters in Concord, Mass. and plants in Newton, Mass. and Tijuana, Mexico is a full-line supplier of memory systems used as add-on or replacement main memories for IBM systems 360 Models 22, 30, 40, 50 and 65 as well as System 370 Models 155 and 165 computers and numerous minicomputers such as Digital Equipment's PDP-11 line and the Varian 620/i. It also manufactures ferrite core, semi-conductor and moving magnetic domain (DOT) memory systems for use in computer processors, peripheral equipment and terminal devices.

CENTRONICS DATA COMPUTER CORPORATION
One Wall Street
Hudson, N.H. 03051
Tel: (603) 883-0111

The popular Centronics dot matrix serial impact printers feature speeds of 100 to 330 characters per second and 60 to 200 lines per minute. The recently introduced 80 column Model 306 printer, priced at \$1,995, is one of the highlighted products. The low cost Centronics Model 401 CRT terminal, priced at \$1,495, allows keyboard controlled data entry, editing and communications capabilities for system on-line and off-line operations. A wide variety of popular communications and computer interfaces are available to meet most system requirements.

CIG COMPUTER PRODUCTS, INC.
1351 Washington Blvd.
Stamford, Conn. 06902
Tel: (203) 359-2100

CIG Computer Products, Inc. markets and services computer products and systems throughout the world.

CIG 370 Package Leasing

- Flexibility
- Savings up to 60%
- Graduated growth with early terminal options CIG-Data Recall Mark II Memory
- Four component design
- Failsafe reliability
- IBM 370 Memory (Virtual Storage)

- IBM 360 (all models)
- UNIVAC CIG I/O Channels
- 360/370 Block Multiplexer Channel
- 360/370 Selector Channels
- 360/370 Multiplexer Channel
- CIG Disk Subsystems CIG Tape Subsystems CIG/EDOS (Extended Disk Operating System)

CINCINNATI MILACRON, PROCESS CONTROLS DIVISION
Lebanon, Ohio 45036
Tel: (513) 494-5486

Cincinnati Milacron, manufacturer of reliable general-purpose minicomputers, wants you to "get it in writing." Tell us your applications and we will produce a proposal within minutes.

A CIP/2200 minicomputer based system displays all the relevant information on a CRT. You select the components needed, and the CIP minicomputer system automatically produces your proposal. See this unique system in operation and get full details on the economy and reliability of minicomputers from Cincinnati Milacron.

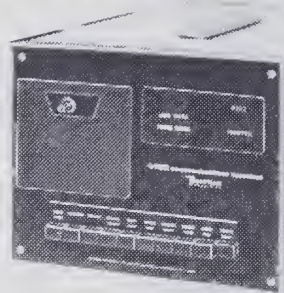
COMPUTER DEVICES, INC.
9 Ray Avenue
Burlington, Mass. 01803
Tel: (617) 273-1550

Computer Devices, Inc., a TechVan Corporate Partner, manufactures the TELETERM family of low-cost time-sharing terminals and printers.

Peripheral Shopping Center

TECHTRAN

#1 in
reliable
High
Speed Cassette
Communications
Terminals!



TECHTRAN

INDUSTRIES

580 Jefferson Road, Rochester, N.Y. 14623 • (716) 271-7953
NEW YORK (203) 776-3816 CHICAGO (312) 671-3220
LOS ANGELES (714) 541-8518



MOVING HEAD DISC
(Series DPX)

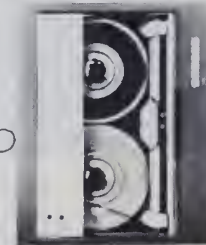
Up to 100 million bits storage.
Top and front load.
Fixed and removable disc.



FIXED HEAD DISC
(Series DX)

Up to 16 million bits storage.
Non-contact heads.
Plug-in storage module.

\$3,445.
Qty. 1



TAPE TRANSPORT
(Series 600)

25 through 75 ips in same package.
200, 556, 800, 1600 cpi and combinations.
Plug compatible with Pertec, Wang, Ampex.

SHOP ANYWHERE
BUT
BUY PER DATA

perdata

102 New South Road • Hicksville, N.Y. 11801 • (516) 938-2851

• TWX 510 221-1881

All TELETERMS are rugged and dependable, utilizing a thermal (non-impact) printing technique for printing. Weighing only 22 pounds and fitting under an airline seat, the CDI 1030 TELETERM is being shown at the Computer Caravan in three exciting useful, NEW models:

CDI 1030 APL — the first portable terminal for the APL user. Available in ASCII code or EBCD as a direct replacement for the popular IBM 2741 APL device.

CDI 1030/MULTICS — the first portable with a MULTICS keyboard.

CDI 1030/ACT — for a time-sharing network. Communicates with other 1030's, TTY or time-sharing computers directly.

COMPUTER TRANSCEIVER SYSTEM INC.

66 Midland Avenue
Paramus, N.J. 07652
Tel: (201) 261-2800

Manufacturers of EXECUPORT® high speed data terminals for remote data collection & Transmission. CTSI will demonstrate their portable, quiet 310 series; the new model 1200 with speeds to 120 CPS; the new model 625 Paper Tape Punch & Reader; and the new 420 magnetic tape memory unit for off-line collection/storage/transmission of data through cassette recording. The equipment is characterized by extreme reliability: MTBF = less than one service call per year.

CULLINANE CORPORATION

One Boston Place
Boston, Mass. 02108
Tel: (617) 742-8656

Cullinane Corporation will feature at The Computer Caravan its proprietary software products including those for use with data base management systems. These products are CULPRIT, IMS/CULPRIT, TOTAL/CULPRIT, RDMS/CULPRIT and user department versions including EDP-AUDITOR, PERSONNEL-EDP-REPORTER, MARKET-EDP-ANALYZER, PORTFOLIO-EDP-REPORTER and PAYOUT. In addition, a seminar on the EDP-AUDITOR/CULPRIT Systems will be held from 4 to 5 PM on the second day of each show. Participants in the seminars will be able to attend the Computer Caravan free of charge as guests of the Cullinane Corporation.

Those wishing additional information may contact the Cullinane Corporation at its booth at The Computer Caravan or calling (617) 742-8656.

DATA DISC, INC.

686 W. Maude Avenue
Sunnyvale, Calif. 94086
(408) 732-7330

Data Disc, Inc. will exhibit its ANAGRAPH Display System. IBM 360/370 users will see an operational system which not only offers

IBM 2260 emulation but also provides truly versatile graphic display capability. OEM's will be able to see Data Disc products at work in an operating system.

ANAGRAPH provides up to 32 users with low cost TV terminals. Image storage and refresh is independent of the CPU. ANAGRAPH employs a minicomputer, TV terminals, keyboards, a Data Disc head per track disc memory, a Data Disc graphic display system and a Bright Industries IBM compatible magnetic tape drive to provide a cost effective system with grow power!

DATA GENERAL CORPORATION

Route 9
Southboro, Mass. 01772
Tel: (617) 485-9100

Minicomputers, peripherals, and software. (Full listing on Page S/16.)

DATAPRO RESEARCH CORP.
One Corporate Center
Route 38
Moorestown, N.J. 08057
Tel: (609) 234-4300

Datapro Research Corporation is displaying DATAPRO 70, the most widely used data processing reference service in the world. DATAPRO 70 is unique among reference services in that it provides monthly updated product reports on all important EDP hardware and software products — in one convenient three-volume set. DATAPRO 70 provides fast reports on new products to keep you up to date, plus in-depth product analyses to help you in planning EDP systems and selecting equipment. The DATAPRO 70 service also includes personalized consulting by telephone, and NEWS-COM, a monthly newsletter on significant product trends and developments.

DATA PRODUCTS CORPORATION
6219 DeSoto Avenue
Woodland Hills, Calif 91304
Tel: (213) 887-8000

LINE PRINTERS

— Medium to high speed impact printers: for OEM systems ranging from low cost minicomputers and terminals to high speed EDP systems.

— Satellite Printers: for economical off line printing. CORE MEMORY PRODUCTS.

— Memory Systems: a complete line for applications ranging from mainframe to bulk storage in commercial and military systems. Also, plug compatible replacement memories.

— Stacks: customized to your needs.

— Cores: sizes from 14- to 30-mil. COMPUTERIZED DISTRIBUTION

If you have any questions
about data communication...

Don't ask me!

Bring your questions to the Computer Caravan
and ask these fellows in the ICC booth.



Matt Kenny
V.P.-Sales



Jon Blasdel
National Accts. Sales Mgr.



Bob Toombs
Southeastern Reg. Sales Mgr.



Tom Thorsen
Sales Representative



Jim Hunt
Sales Representative



Bill Percival
Sales Representative



International Communications Corporation

7620 N.W. 36th Avenue, Miami, Florida 33147
Telephone 305 + 691-1220 305 + 836-4550

In Europe: RACAL-MILGO LIMITED Reading, Berks, England

MANAGEMENT SYSTEMS

— CODONS's: dedicated system that slashes distribution cost COMMUNICATIONS

— DataPak-Multiplexing Systems: for reducing data transmission costs.

— DETECT test set, for quickly locating network failures.

DECISION

5601 College Avenue
Oakland, Calif. 94618
Tel: (415) 654-8626

Decision will be showing three newly announced products and systems: the Data General NOVA compatible line of peripheral controllers, systems, a new real-time operating system, and innovative Optical Page Reader and DECISION's Optical Data Entry System.

The Model 3170 controller plugs into the NOVA line providing a minimum of 11.6 megabytes of storage from a Diablo, Caelus or Wangco 5440 top loading cartridge disk drive. Another featured peripheral is the Model 3180 phase encoded 1600 bpi tape drive controller.

A key product introduction is the DINOS family of NOVA operating systems. DINOS I, II and III are high performance, low-cost and more useful answers to Data General's RDOS.

Decision's Model OMR 6500 Optical Reader involves a new concept which scans a fixed page in contrast to the conventional approach of moving the page across the scanning device. The result is greater throughput with minimum opportunity for error. The OMR 6500 has many options, broad flexibility of input data forms and inherent

design simplicity that maximizes ease of maintenance.

Decision's Optical Data Entry System evolves around the Model OMR 6500 and provides users with the first proven computer base Optical Data Entry System.

DELTA DATA SYSTEMS CORPORATION

Woodhaven Industrial Park
Cornwell Heights, Pa. 19020
Tel: (215) 639-9400

DELTA will exhibit a typical video display terminal system which includes a terminal with special function keyboard, a cassette recorder, and a line printer. The company will also show its DELTA 5000 video display terminal and Multi-Term programmable terminal multiplexer. These and other DELTA products offer unique features such

as special character generators, upper/lower case, PAGING, built-in interfaces for computer/terminal compatibility, 3000-character memory, and others, all designed to solve difficult terminal system problems.

EASTMAN KODAK COMPANY
Business Systems Markets Division
343 State Street
Rochester, N.Y. 14650
Tel: (716) 724-4745

Eastman Kodak will show how KODAK KOM Microfilers contribute to Computer Output Management. Various pieces of microfilm retrieval hardware, including the KODAK EKTALITE Reader, will be featured. Microfilm systems specialists will be available to discuss your computer output requirements and to show how computer output microfilm can provide added output flexibility to your DP shop.

ELECTRONIC MEMORIES & MAGNETICS

12621 Chardon
Hawthorne, Calif. 90250
Tel: (213) 644-9881

EMM MICROMEMORY Processor Storage Systems

Interfaces with System/360 and System/370 computers. Storage capacity: 16,384 to 3,145,728 bytes. Cycle time: 750 nanoseconds to 2.5 microseconds. Large card design for easy maintenance. Permits model and capacity changes in the field. Internal power module protects stored data in case of power failure.

CAELUS DISK MEDIA

CMCX DISK PACK for System/370

CMIII DISK CARTRIDGE for System/3

CMI DISK CARTRIDGE for new low cost systems

PGI 844 UNIVERSAL CONTROLLER AND DISK SYSTEM

Interfaces with System/360 and System/370 computers. Handles intermixed track densities and variety of I/O devices. Controller MTBF of 10,000 hours. 10% as large as 2314 controller. Interchangeable plug-in cards simplify maintenance. Test mode option permits off-line media verification.

ENTREX, INC.

168 Middlesex Tpk.
Burlington, Mass. 01803
Tel: (617) 273-0480

ENTREX, INC. the leading manufacturer of Key-to-Disk data entry equipment including a preview of new, improved software. ENTREX will demonstrate the system's extensive editing capabilities and validity checks, including crossfooting and subtotaling.

A highlight of the ENTREX Exhibit is the introduction of the new System 280, a low cost key-to-disk

13 reasons why you should go to the Computer Caravan.

iomec inc
Model 2560
Reader



New high-speed reader — first 1,000 cps reader at less than \$1,000.

iomec inc
Model 7470
Punch/Reader



New punch/reader combination with speeds up to 70 cps punch and 400 cps read. Easy loading and card removal with no need to slide unit out from panel.

iomec inc
Model 2016
Reader



New low-cost reader — 150 cps asynchronous. Lensless optical system. Single moving part.

iomec inc
Model 170
Punch



New 170 cps punch—motor driven interposer for positive perforating. Echo read-after-write check-back optional. Easy front panel loading. Adjusts to paper width automatically.

iomec inc
Model 2032
Reader



New medium-speed reader — single moving part, 300 cps asynchronous and 400 cps synchronous. Lensless optical system.

iomec inc
Iodisc Drive
Model 3404



New iodisc Series 3000 top-loading disc drive — 200 tracks/inch using IBM-type 5440 cartridge, 60 msec average access time and 96 million bit capacity. Light weight and small enough to easily fit 24-inch deep standard rack.

iomec inc
Iodisc Drive
Model 31



New iodisc Series One includes fixed and removable disc for combination of inexpensive removable media system with mass storage add-on capability.

iomec inc
Model 4040
Reader/Handler



New reader/handler combination — field-proven 2540 in one integrated unit with servo-controlled handler. Electrical noise has been eliminated.

iomec inc
Iotape Controller
Model 101



New Series Three Controller card mounted Carritape drive for plug-in directly inside your minicomputer. Provides extremely large capacity, slow-speed ROM. Ideal compact program loader.

iomec inc
Model 40
Portaverter



New Portable Numeric Data Entry System for inventory accounting, order entry, stock replenishment and financial transactions. Completely self-contained with magnetic cartridge data storage.

iomec inc
Model 202
Printer



New line printer — varied font sets and multi-font buffer automatically adjust to speeds of 142, 202, 256 and 526 lines per minute. Highest quality printing on 6-part — or more — forms.

iomec inc
Iotape Controller
Model 9100



New plug-in Controller for low-cost Series Ten magnetic tape transport handles both 800 cpi NRZI and 1600 cpi formatters at the same time. Each formatter controls up to 4 tape drives.

iomec inc
Iotape Transport
Model 313



New Iotape Series Three triple (Model 313), dual (Model 312) and single (Model 311) Carritape drive-pacs. Large capacity magnetic tape cartridge for reel-to-reel performance.

The new iomates. See them all in
Boston — Feb. 13-15. Washington — Feb. 20-22.
New York — March 5-7. Atlanta — Mar. 13-15. Houston — Mar. 20-22.

Our systems are going to town.

It's time for another dynamic Caravan showing. This year, we're featuring a multi-terminal, on-line data entry system in a multi-task environment. The extremely flexible, 630 nsec, multi-bus V 73 is on your track. Commanding an order entry program running under our VORTEX operating executive with print-out in hard copy on our super-versatile STATOS 31® printer/plotter. And just about every bell and whistle of modern technology. A total systems capability that solves a broad range of complex systems applications problems. Faster. And with more efficiency and flexibility than anything else you'll see around.

V73 with VORTEX

You'll view a real-time operating system at its best. CRT's operating independently of each other simultaneously, show the multi-tasking capability with foreground tasks in a real-time environment. Note that VORTEX has automatic checkpoint/restart and dynamic memory allocation for most efficient usage. After you've seen the flexibility of VORTEX in action and our new V73 doing its fast and powerful stuff, you'll wonder why it doesn't cost more. Especially when you consider its multiple path interfacing between processors and memories and I/O's.

STATOS

Here's where you'll get your hands on the results of your order entry program. You'll see the immediate output from two or more tasks—each of which outputs data direct to the STATOS 31. Fast. A capability of printing upper

and lower case characters at up to 1,000 lines per minute. With definition that really pops right out at you. Without degrading the performance of the overall system. Let your imagination run wild. Enter any order you can think of in any quantity for up to ten different items. When you finish placing your order, you'll see an instant print-out on the STATOS 31 printer/plotter—complete even to the shipping label.

ADAPTS

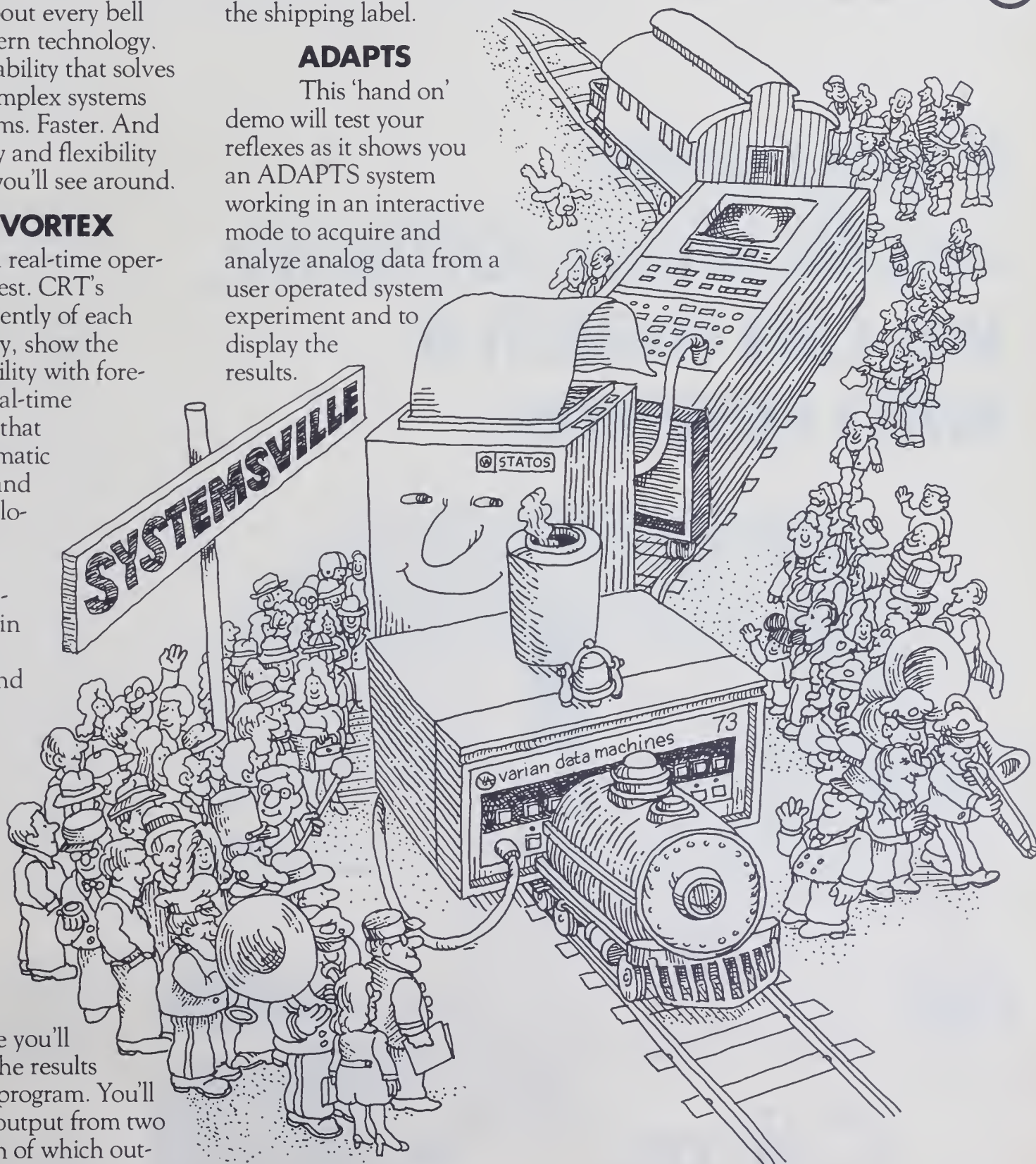
This 'hand on' demo will test your reflexes as it shows you an ADAPTS system working in an interactive mode to acquire and analyze analog data from a user operated system experiment and to display the results.

Bells, lights and buzzers will test your reflexes and stimulate your thinking about our systems capabilities.

Get into our system. Go to town with us.

Varian Data Machines,
2722 Michelson Drive, Irvine,
California 92664 (714) 833-2400

varian data machines 



system for the user of less than ten keypunches. System 280 offers most of the features of the larger System 480, plus a unique communications option.

GENERAL COMPUTER SYSTEMS, INC.
P.O. Box 6251
Dallas, Texas 75222
Tel: (214) 242-8411

The GCS 2100 multimedia data entry system provides Interactive Data Editing At Source (*IDEAS*®).

Featured with GCS 2100 will be turnaround document processing and word processing.

THREE TYPES OF INPUT will be demonstrated: punched cards, the standard 029 keyboard for data entry, and the typewriter keyboard for word processing.

FOUR TYPES OF OUTPUT will also be operational: magnetic tape,

teletype, sixty line per minute supervisor station, & high speed printer for letter writing.

The GCS 2100 with 29 million characters of data storage, provides CRT formatting with GCS's unique *PROMPTING*® for both data entry and word processing.

... the data editing company with *IDEAS*®.

HAZELTINE CORPORATION
Pulaski Road
Greenlawn, N.Y. 11740
Tel: (516) 549-8800

Hazeltine Corporation, Greelawn, New York, will exhibit the Hazeltine 2000 teletype compatible video display terminal, dual magnetic tape cassette unit and hard copy printer. The Hazeltine 2000 is used either as a stand alone remote terminal which can operate at variable speeds up to 9600 BPS, or as an

off-line data entry device in conjunction with the magnetic tape cassette unit. Several editing features as well as dual intensity video for protected format display provide a powerful system for data preparation, entry and retrieval.

HEWLETT-PACKARD COMPANY
11000 Wolfe Road
Cupertino, Calif. 95014
Tel: (408) 257-7000

Hewlett-Packard's display includes the remarkable new HP-80 shirt-pocket calculator. Brother to the very successful, engineering-oriented HP-35 calculator, the HP-80 is designed to serve the needs of the business and financial community.

A demonstration of low-cost batch processing with HP's thoroughly modern mini is one of the

features of the 2120 DOS-M system, while multiprogramming capability is documented in a variety of commercial, scientific and engineering applications.

OEM product displays include the micro-programmable HP 2100 minicomputer, HP-7900 moving-head discs and 7970 digital magnetic tape units.

INCOTERM CORPORATION
6 Strathmore Road
Natick, Mass. 01760
Tel: (617) 655-6100

INCOTERM Corporation is displaying its new low-cost SPD 900 series Remote Batch Terminals. The series 900 offers compatibility with IBM 2780 and 3780, Univac 1004, CDC User 200, 360/20 HASP and ICL 7020.

The key element of the series 900 is the famous INCOTERM 10/20 Stored Program Display and electronic keyboard. Three models offer a choice of line printers from 200 to 400 lines per minute and card readers from 150 to 300 cards per minute.

INFOREX, INC.
21 North Avenue
Burlington, Mass. 01803
Tel: (617) 272-6470

INFOREX will exhibit its 1302 Intelligent Key Entry System and highlight its new KeyScan and In-Line Data Entry Systems. The 1302 Intelligent Key Entry System features all keypunch, key-verify, and key-to-tape functions as standard, plus many new key-to-disc capabilities in a system with proven performance and reliability. KeyScan, for the processing of turnaround documents and check remittances, offers a unique combination of OCR, Automatic Check Processing and operator keyboard intervention within an integrated system designed to reduce the number of steps and personnel, thereby lowering the cost per document processed. The new In-Line Data Entry System is designed to meet the users' specific data preparation needs by offering a wide array of editing checks assuring immediate error detection and correction. These range from simple table look-ups to field, record, document and group integrity tests.

INFOTRON SYSTEMS CORPORATION
7300 N. Crescent Blvd.
Pennsauken, N.J. 08110
Tel: (609) 665-3864

Infotron Systems Corporation will exhibit their latest time division multiplexer (TDM) and front end equipments, the Timeline 240 and Timeline 450.

The Timeline 240, an ultra reliable TDM, accommodates all available terminal types, codes and speeds — both asynchronous and synchronous — from 37.5 to 4800

If you write application software, we can match it with systems.

Why stop at selling or leasing software systems to end users? Now you can offer them complete minicomputer package systems.

This way they'll be able to get everything they need from you. And you'll be able to get everything you need from us.

Wider choice of peripherals We offer a full line of peripherals to go with our SUE and MAC minicomputers: IBM compatible 5440 disks, CRT/keyboards, printers from 100 cps to 600

lpm, magnetic tapes, cassettes, punched card devices and paper tapes. Anything your customer needs. And when his needs change, so can the system. Easily. Even by factors of 2 or 3.

Complete software tools

To make your programming burden lighter we offer a full set of software tools: Fortran, assemblers, utilities, RTOS, sort/merge, DOS and RPG/SUE. That last item is 98% compatible with RPG II by the way.

And we're the only company we know of that unconditionally warrants all our software for a full year.



Maintenance too We'll handle any and all problems your customers might have, promptly and expertly, anywhere. (We recently solved a problem in Bangkok, for instance.) And we'll do it by contract or on call, either way you want it.

We also offer training classes in maintenance as well as in programming.

Add it up So what you'll have is a more salable package to offer an end user. Everything he'll ever want or need in a minicomputer system, right down to the enclosures. (Which we'll put your name on, if you wish.)

Everything ready and working from the minute it's wheeled in his door.

And you'll be dealing with an established, reputable company. One that will be there when you need us.

Let's talk. Call the number below, collect, or write us at 6201 E. Randolph Street, Los Angeles, California 90040.

213/722-6810

Lockheed Electronics
Data Products Division

YOUR NAME

Call us.

baud. Features include critical component redundancy, full system diagnostics, automatic baud rate detection, dynamic overspeed protection.

The Timeline 450 Port Selector extends a computer's traffic handling capability. Front end ports are assigned to communications channels on a dynamic rather than dedicated basis, allowing fewer ports to service more lines. Maximum capacity is 254 lines by 124 ports.

INTERDATA, INC.
2 Crescent Place
Oceanport, N.J. 07757
Tel: (201) 229-4040

Interdata will display several members of its New Series of minicomputers. This upward compatible family of processors covers the complete range of the price/performance spectrum. Members of the family include: the Models 70, 74 and 80 for general purpose use and the Models 50 and 55 for Data Communications. Interdata will also display its full range of software Operating Systems: a Real Time Telecommunications Operating System, a Real Time Operating System, a Basic Operating System and a Disc Operating System. Each afternoon during the show, Interdata will present a meaningful seminar on either "Microprogramming," "Data Communications," or "Operating Systems Software."

INTERNATIONAL COMMUNICATIONS CORPORATION
A Milgo Company
7620 N.W. 36th Avenue
Miami, Fla. 33147
Tel: (305) 691-1220

ICC/MILGO will display a complete line of data communication products, featuring high-speed modems for data transmission over dial-up phone lines or leased data lines. Modems from ICC operate at data rates from 2400 bits-per-second to 9600 bits-per-second. The ICC display will also include data communication test equipment and accessories. Experienced personnel will be in attendance for consultation.

IOMEC INC.
Route 9
Southboro, Mass. 01772
Tel: (617) 481-2500

IOMEC, one of the largest independent OEM suppliers of minicomputer peripherals and data entry terminal equipment announces 13 new product additions at the 1973 Computer Caravan.

The new products include:

- Five brand new paper tape products — featuring the first 1000 cps reader for less than \$1000 and the 70 cps punch/400 cps reader combination.

- An entirely new series of disc drives including new mass storage

(36 megabits) add-on dsic memory for the Series One "floppy" disc system.

- Plus Model 200 multi-font buffer line printer; varied packages of the IOTAPE Series Three minicartridge deck and the Series Ten large tape transports.

- One of the most advanced portable data entry equipment systems in the market today. The system uses micro-logic circuits to provide an extensive range of features at the lowest price.

ITT DATA EQUIPMENT & SYSTEMS DIVISION
East Union Avenue
East Rutherford, N.J. 07073
Tel: (201) 935-3900

The ITT 3501 Asciscope is a low-cost, TTY compatible CRT display terminal complete with keyboard,

acoustic coupler, integral modem, buffer, and printer interface — no extra costs. The Asciscope can communicate terminal-to-computer or terminal-to-terminal. It features interfaces for a Data Access Arrangement when using its integral 300 bps modem, for external modems of 1200 or 2400 bits per second, and for printers operating up to 120 characters per second. The Asciscope leases for \$65.00 a month, including maintenance. Nationwide installation and service by ITT includes on-the-spot exchange if a leased unit should ever require service.

LOCKHEED ELECTRONICS COMPANY, INC.
Data Products Division
6201 E. Randolph St.
Los Angeles, Calif. 90040
Tel: (213) 722-6810

The SUE minicomputer data processing system for small business applications will be demonstrated by the Data Products Division. System flexibility provides for memory expansion to 64K bytes, up to four 5440 type disk drives, high performance printers, magnetic tape, and card equipment. Comparable to IBM System 3/model 6, the CRT oriented SUE system is of particular interest to application software organizations who wish to market a turnkey total package for small business applications. Manufacturer supplied software includes RPG II, a disk operating system, and sort/merge, as well as assemblers and utilities.

Also displayed are memory modules of the MM-365, a replacement memory for the IBM 360 model 65 and up.

*Penril is not the largest
manufacturer of high speed
modems in the world.*

But we will be.



Penril
Data Communications, Inc.

5520 Randolph Road
Rockville, Maryland 20852
301/881-8151

Regional offices:

Atlanta, Boston, Chicago, Houston,
Los Angeles and New York

Penril's 4800B-1 modem pictured above has been selected by the U.S. Internal Revenue Service for use in its nationwide data communications network.

MODULAR COMPUTER SYSTEMS, INC.
1650 West McNab Road
Ft. Lauderdale, Fla. 33309
Tel: (305) 974-1380

The MODCOMP MAX III real-time multiprogramming operating system will be demonstrated. Foreground tasks will be initiated and executed. Assemblies and FORTRAN compilations will be performed as background operations. A MODCOMP II/25 computer with 32K words of 16-bit, 800 nanosecond memory will be used for the demonstrations. System peripherals will consist of disc, card reader, two CRT's, paper tape reader, and keyboard/printer. Analog, digital and communications interfaces will also be displayed.

While at the MODCOMP booth, guests may register to win a MOD-

COMP II computer with 16K words of memory. This computer will be awarded at the end of the Caravan's ten-city tour.

PARADYNE CORPORATION
8550 Ulmerton Road
Largo, Fla.
Tel: (301) 654-0033

Paradyne Corporation will display: The BISYNC-48 super modem featuring the highest throughput available on dial-up lines — plus, guaranteed error-free transmission; our 4800 bps, automatically-equalized M-48 modem with really usable self-test features; the BISYNC Analyzer — the unique test instrument that provides immediate fault isolation in BSC communications links; and the revolutionary remote I/O and computing systems that eliminates conventional com-

munications hardware, terminals, modems and software — Paradyne's astonishing PIX.

Sales and Services offices in Largo, Florida (headquarters); and San Francisco; Los Angeles; Atlanta; Chicago; Boston; Detroit; St. Louis; New York City; and San Antonio.

PENRIL DATA COMMUNICATIONS, INC.
5520 Randolph Road
Rockville, Md. 20852
Tel: (301) 881-8151

A complete line of data modems operating from 300 bps to 4800 bps for leased line and DDD data transmission. End user, OEM and custom designed configurations will be displayed. Also, specially designed telephone line test and analyzing equipment will be demonstrated.

PER DATA CORPORATION
102 New South Road
Hicksville, N.Y. 11801
Tel: (516) 938-2851

Digital Tape Transport —

7 or 9 track; read after right or read only, 25 to 75 IPS. 200, 556, 800 & 1600 CPI densities. IBM compatible. Fixed head disk drive fast head per track random access storage. Storage capacities up to 1 million 16 bit words. Average access time - 8.5 ms. Non-contact head loading.

Moving Head Disk Drive — Front load or top load. Storage capacity up to 100 million bits at density of 200 track. Access time — 38 ms.

Controllers & Formatters — for tape transport, moving head disk, fixed head disk and printer. Fully self contained including power supply and cabling.

PRIME COMPUTER, INC.
17 Strathmore Road
Natick, Mass. 01760
Tel: (617) 655-6999

The Computer Caravan is PRIME Computer's first major public demonstration of its recently announced PRIME 200 small computer. Featuring a unique (software first) design — all systems software was completely specified before the computer's hardware was designed — the system will be used to demonstrate an extremely powerful disc operating system. PRIME's DOS-200 features extensive file management resources, batch processing system, numerous disc file access discipline, and file system common to all PRIME software.

SANDERS DATA SYSTEMS
Daniel Webster Highway
Nashua, N.H. 03068
Tel: (603) 885-4211

Sanders to feature intelligent terminal system with disk during Caravan.

Sanders Data Systems, Inc. will exhibit and demonstrate both their 804 stand alone and 810 cluster display terminal systems using standard software packages for order processing, billing, inventory control, data entry, remote job entry, and other business applications during the Computer Caravan.

The 810 system features a disk memory which can provide up to 5 million bytes of storage, while the 804 system interfaces a tape cassette transport for applications needing smaller storage capabilities. Both systems will be seen in operation with 32 character per second and 200 line per minute printers, and a card reader.

SIERRA RESEARCH CORPORATION
47 Middlesex Tpke.
Burlington, Mass. 01803
Tel: (617) 273-0900

Vermont Research

FIRST IN MEMORIES

Whether it is disc or drum — whether it is head per track or moving head — whether it is digital interface or complete memory system, you should call us at Vermont Research to review your requirements for rotating memories

Head Per Track Drums Series 3000

The best in performance and reliability. The standard for head per track memories is set by Vermont Research.
2200 bits per inch
8.7ms average access
4 megacycle data rate and a range of products to choose from

Moving Head Disks Series 5000

A moving head memory with a conservative Vermont Research specification. Surely the standard of moving head devices.
400 tracks per inch
4000 bits per inch
35ms average access
6 megacycle data rate
40 megabyte capacity and a range of products to choose from

Vermont Research Corporation
Precision Park
North Springfield
Vermont 05150
Telephone: 802-886-2256
Telex: 710-363-6533

VRC Inc.
5261 West Imperial Hwy
Los Angeles
California 90045
Telephone: 213-641-7100

Vermont Research Limited
Cleeve Road
Leatherhead
Surrey
Tel: Leatherhead 74758
Telex: 23280

It's time your computer got its hands dirty. Sierra Research Data Systems Division will demonstrate the capabilities of the SDA-770 Data Collection System to collect, inquire, retrieve and display manufacturing data. Typical inventory, material flow and labor distribution control programs will be demonstrated with the Sierra Operating System and FDC (Factory Data Collection) programs. Remote data collection will be demonstrated twice daily via on-line communications between a real-time SDA-701 Remote Terminal and SDA-710 Attendance Station at the Computer Caravan and a Sierra SDA-770 Central Controller at our plant in Boston, Massachusetts.

SYCOR, INC.
100 Phoenix Drive
Ann Arbor, Mich. 48104
Tel' (313) 971-0900

Sycor will exhibit its popular Model 340 Intelligent Communications Terminal in two configurations — branch office order entry and remote job entry. The branch office terminal will demonstrate Sycor's unique dual communications feature — low speed (110-300 baud) asynchronous communications compatible with major time sharing systems and high speed (1200-4800 baud) binary synchronous communications. The remote job entry configuration features a 200 lpm printer, a 250 cpm card reader, and is compatible with computers operating under HASP or ASP control. Both configurations are user programmable with Sycor's T.A.L. (Terminal Applications Language).

SYSTEMS ENGINEERING LABORATORIES, INC.
6901 West Sunrise Blvd.
Ft. Lauderdale, Fla. 33313
Tel: (305) 587-2900, ext. 544

Systems Engineering Laboratories will display the power and versatility of their SYSTEMS 72 computer. It will be running FORTRAN, BASIC and Batch at the same time it is shooting craps with booth visitors.

- SYSTEMS 72, the first small, virtual-memory computer, combines the advanced problem-solving capabilities of much larger computers with the easy operation and economy of minicomputers.

It features: time-sharing - virtual memory - reentrant FORTRAN/BASIC - multiprogramming - all processors available to users console simultaneously.

- SYSTEMS will also show a film on EDITS (Engineering Documentation Interactive Terminal System), a new system for faster, more economical preparation of engineering drawings.

TALLY CORPORATION
8301 South 180th Street
Kent, Washington 98031
Tel: (206) 251-5500

Tally Corporation will feature the Datascribe — the total data entry, communication print out system plus the new Tally line printer — the most cost effective choice for intermediate speed printing applications.

The Datascribe Communicator with its unique data compression feature eliminates transmittal of redundant information which reduces telephone line time up to two-thirds. Transmission speeds range from 80 to 420 records-minute depending on the modem used and the amount of data compression available.

Data on magnetic tape can be printed at up to 200 lines per minute on the new Tally printer. The patterned CROSS-POINT® printing technique results in unprecedented reliability and consistent high quality multiple copy at low cost per page.

TECHTRAN INDUSTRIES, INC.
580 Jefferson Road
Rochester, N.Y. 14623
Tel: (716) 271-7953

Cassette Communications Terminals, EIA RS232 and TTY Compatible featuring single and dual decks, switch selectable speeds to 2400 baud, High Speed Search, FULL Remote Control, Data Edit, Switch Selectable On-line/Off-line operation; models for both ASCII and IBM 2741 operations.

TEKTRONIX, INC.
P. O. Box 500
Beaverton, Ore. 97005
Tel: (503) 644-0161

Tektronix shows new APL graphic terminal.

The 4013, Tektronix's new APL terminal will be shown at the Computer Caravan. The company will also show the 4912 Digital Cassette Tape Unit and 4610 Hard Copy Unit. APL provides an extremely flexible language for computer graphics. Tektronix has implemented a group of functions to exploit the advantages of APL as a programming language for graphics.

The 4013 is a member of the 4010 family of computer display terminals. Pricing and delivery information is available at the booth.

TELETYPE CORPORATION
5555 Touhy Avenue
Skokie, Ill. 60076
Tel: (312) 982-3134

Teletype Corporation is exhibiting their model 38 wide platen terminal

When you visit

the MODCOMP exhibit, you can register to win a MODCOMP II computer with 16K words of 800 nanosecond memory. Contest rules and entry blanks are available at the MODCOMP booth.

While visiting us, you will see a MODCOMP II system with disc, CRT's and other peripherals operating under our MAX III Real-Time Executive. Real-time tasks will be scheduled, initiated and executed while FORTRAN compilations and assemblies are performed at a checkpointable, lower priority level in the background.

Come see a *real* real-time executive in action at the MODCOMP booth!

Meet the MODCOMP Computer Family

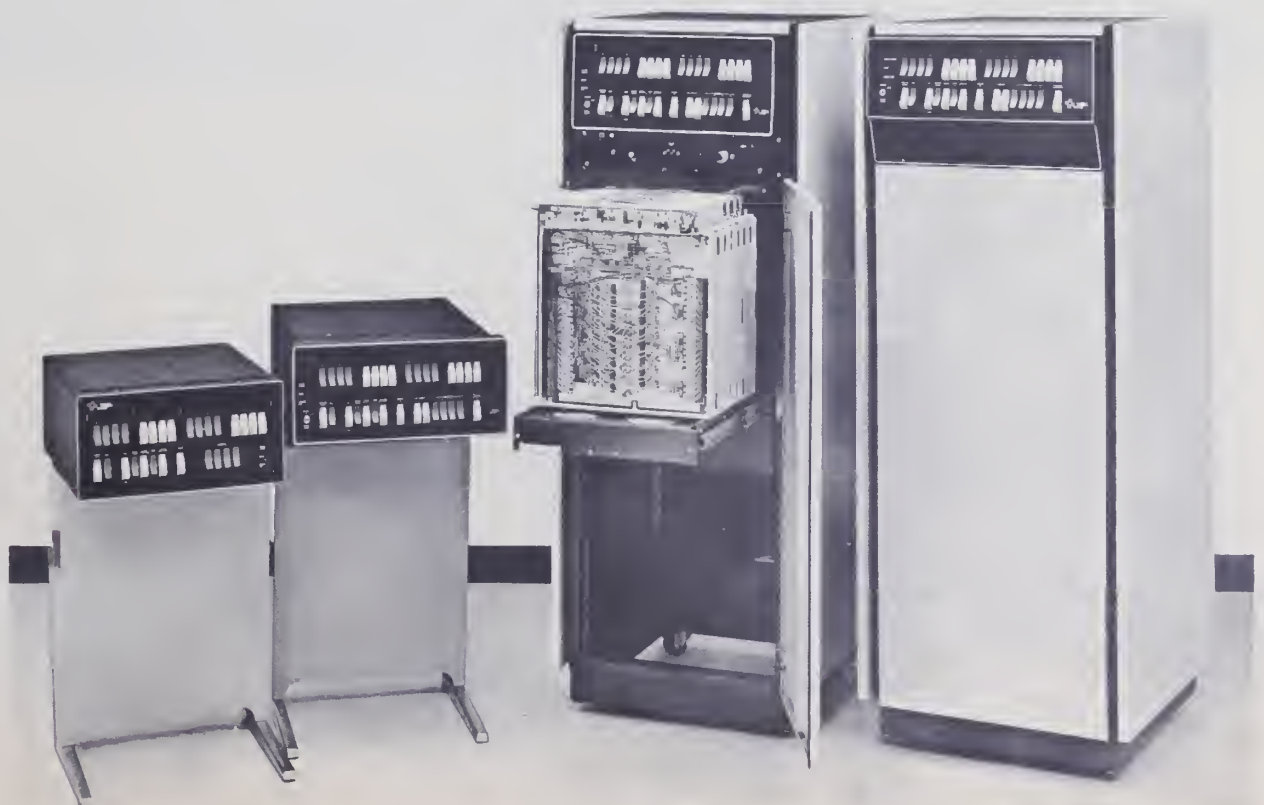
at the
Caravan

See one...
Run one...
Buy one...

WIN ONE!



1650 W. McNab Road
Fort Lauderdale, Florida 33309
Phone (305) 974-1380



and the Teletype® 4210 magnetic tape data terminal featuring the automatic rewind and local print-out option. When combined as a remote-computing terminal arrangement, you transmit and receive online at speeds up to 240 characters per second, and then print out data at lower local speeds, all on an unattended basis. The model 38 terminal prints a full 132 character line at 10 characters per inch in upper and lower case, and accepts standard 14-7/8" fan-fold paper. Total price for both terminals is less than \$4,000.

TEXAS INSTRUMENTS INC.
P. O. Box 1444
Houston, Texas 77001
Tel: (713) 494-5115, Ext. 2165

"Silent 700*" Electronic Data Terminals and minicomputers will be

demonstrated and displayed by TI personnel. The new, low-cost "Silent 700" ASR teletypewriter with twin magnetic tape cassettes will be demonstrated, as will the popular Model 725 Portable Data Terminal. Two 16-bit minicomputers will be on display; the Model 960A "Bit-Pusher*" computer, and the Model 980A high-performance general purpose computer. Both computers have fast semiconductor memory and many standard and built-in features for more cost-effective computer applications.

*Trademarks of Texas Instruments Inc.

VARIAN DATA MACHINES
2722 Michelson Drive
Irvine, Calif. 92664
Tel: (714) 833-2400

Varian Data Machines demonstrates The Model 5016 Disk Memory

broad systems capability along with some new products. ADAPTS, Varian's laboratory automation system built around Extended BASIC, will be demonstrated on a 620/L-100 computer. Also on display are VDM's new V73 medium-scale computer and the STATOS 31 electrostatic printer/plotter. These items along with other peripherals, are tied together in one system under control of the VORTEX real-time operating system software. Both laboratory and business-oriented applications will be demonstrated.

VERMONT RESEARCH CORPORATION
Precision Park
S. Springfield, Vt. 05150
Tel: (802) 886-2256

provides 40 megabytes of data storage on one fixed disk, and one removable disk in a top loading 5440 type cartridge (with a 3336 type disk). Technology breakthroughs in proprietary track following and magnetic head design allow conservative track densities of 666 tracks per inch with equally conservative track bit densities of 4100 bits per inch nominal. Access time for this advanced moving head disk is 28 msec average, 60 msec maximum. 3600 RPM operation provides a low 8.33 msec average rotational latency and a fast 6.9 megabit serial data rate. The slide and mounted unit includes an integral DC power supply in its 10 3/8 inches of 19-inch RETMA rack. Also available with the micro-programmed, error-correcting Model 8100 "Intelligent" controller which can serve up to eight disk units.

The Model 3002 Drum Memory is the newest of VRC's dependable head-per-track drums. Data capacity is 9 megabits on 128 tracks. Reliable TBM data recording at 2200 bits per inch allows 4096 16-bit words per track formatted in 128 sectors. 3600 RPM operation gives you true 8.7 average access. A dust-tight enclosure and an automatic head actuation mechanism continue the proven VRC reliability. Mounting slides, DC power systems and distinctive front panel are standard. So is the single connector TTL interface. Available with either the Model 3100 sector-buffered controller or the Model 3400 two-word buffer controller. The Model 3008 is a big brother with up to four times the data capacity.

WESTERN UNION DATA SERVICES COMPANY
16 McKee Drive
Mahwah, N.J. 07430
Tel: (201) 529-1170

Western Union Data Services Company will show side by side the 30 character-per-second EDT 300 AST Teleprinter with its paper tape buffer and its EDT 300 Magnetic Send-Receive, a terminal with integrated magnetic tape buffering capability for remote batch and time-share applications.

DATA GENERAL CORP.
Route 9
Southboro, Mass. 01772
Tel: (617) 485-9100

Data General Corporation, the number two minicomputer manufacturer in the world, will display its minicomputers, peripherals, and software. A system built around a powerful Nova 800 Jumbo will demonstrate a Real-Time Disc Operating System, Timesharing BASIC, and the new Fortran 5 on a variety of terminal devices. Data General's minicomputers are used for all types of applications, including computation, communications and control/instrumentation.

See how Paradyne can help turn your data communications links into assets instead of liabilities. You can't afford to miss seeing these five proven time and money savers when Computer Caravan '73 comes to your city!

1. The BISYNC-48 super modem featuring the highest throughput available on dial-up lines — plus, guaranteed error-free transmission.
2. Our 4800 bps, automatically equalized M-48 modem with really useable self-test features.
3. The BISYNC Analyzer — the unique test instrument that provides immediate fault isolation in BSC communications links.
4. Our revolutionary remote I/O and computing system

that eliminates conventional communications hardware, terminals, modems, and software — Paradyne's astonishing PIX.

5. Service that keeps your links up and running. Discover for yourself how Paradyne products and service maximize performance and reliability of your data links within a cost/benefit context that makes good business sense.

It's your move now!

Just in case you happen to miss us at the Caravan, contact your local Paradyne office for complete details:

Paradyne Corporation
1644 Tullie Circle, N.E.
Suite 102
Atlanta, Ga. 30329
404/634-1296

paradyne

Paradyne Corporation 8550 Ulmerton Road Largo, Florida 33540 813/536-4771

A dual processor system for people who can't afford a single processor system.



Meet the new PDP-15/76.

It's what happens when you add a PDP-11 to a PDP-15. PDP-11 takes over administrative and peripheral tasks, like full input and output spooling, leaving PDP-15 free to work its heart out on things big computers do best. Like computation and interactive graphics.

Together, the two computers can pump out 10 times or more the throughput of an IBM 1130 that costs as much. Or give you the same performance as an IBM 360/44 costing at least twice as much.

And that's probably why you'll buy it.

But if you'd like to think about something more than raw cost/performance, consider what else the PDP-15/76 gives you.

You get PDP-15. A powerful computer system already hard at work in over 600

installations. An enormous library of software. A strong graphics capability. And easy conversions, particularly for FORTRAN.

Add on PDP-11 and you get a whole rash of low-cost, state-of-the-art Unibus peripherals. Which makes it one heck of a lot easier (and cheaper) to put together multi-task, multi-terminal systems.

15/76 comes with a load of proven software that makes the system easy to use. Including a choice of three operating systems... DOS-15, a disk operating system; BOS-15, a Batch Operating System; and RSX-PLUS, a Resource Sharing Executive—\$3,000,000 worth of proven software ready for your application.

The basic PDP-15/76 comes with a

PDP-15 central processor and 16K words of core, 1.2M word cartridge disk pack, industry-compatible magtape unit, paper tape reader/punch, and a PDP-11 central processor with 4K of core.

For \$64K or \$2000/month complete.

And for those of you who already have a PDP-15, you can upgrade to a PDP-15/76 for only \$19K.

Either way, PDP-15/76 is the only way you can get big computer power without spending big computer money.

Write the PDP-15 Group, Digital Equipment Corporation, Maynard, Mass. 01754. (617) 897-5111. European headquarters: 81 route de l'Aire, 1211 Geneva 26, Tel: 42 79 50. Digital Equipment of Canada Ltd., P.O. Box 11500, Ottawa, Ontario, K2H 8K8 (613) 592-5111.

digital

Atlanta Workshop

Bankers to Examine Trust Automation

ATLANTA — Trust department and data processing personnel will put their heads together here on the problems of trust automation at an American Bankers Association (ABA) Trust Operations and Automation workshop March 18-21.

The workshop is jointly sponsored by the Trust Division and the Operations and Automation Division of the ABA. Topics range from trust information systems and

automated methods of tax accounting, to computer output microfilm systems.

Alternative Approaches

O.W. Chapman, vice-president of the American Security and Trust Co., Washington, D.C., will moderate a panel discussion covering alternative approaches to securities handling problems.

A panel on the last day of the meeting

will deal with current legislation issues. Robert L. Bevan, assistant federal legislation counsel of the ABA, will moderate. Other panelists include members of the

Societies/
User Groups

Securities and Exchange Commission, the Office of the Comptroller of Currency and the Senate Committee on Banking.

During the two-and-a-half day workshop registrants will have an opportunity to meet with suppliers of software packages and services relating to trust automation.

Fees for the workshop are \$125 for banking personnel and \$150 for non-bankers. More information is available from Fred Tippet, associate director, Operations and Automation, American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Calendar

March 12-14, Greenbelt, Md. — APL (A Programming Language) User's Conference. Contact: Cyrus J. Creveling, Code 560, Goddard Space Flight Center, Greenbelt, Md. 20771.

March 12-14, New York — 19th Annual Systems Management Conference. Contact: American Management Association, Inc., The American Management Association Building, 135 W. 50th St., New York, N.Y. 10020.

March 16, San Francisco — Association for Systems Management, San Francisco Chapter 22nd Annual Spring Conference. Contact: Jack France, The Bank of California, Systems and Procedures Department, P.O. Box 45000, San Francisco, Calif. 94145.

March 20-23, Monterey, Calif. — CPEUG (Computer Performance Evaluation Users Group) Meeting. Contact: John A. Blue, Chairman, CPEUG, Department of the Navy, Automatic Data Processing Equipment Selection Office, Washington, D.C. 20390.

Martin Interim SCDP President

HUDSON, Mass. — Jerry Martin has assumed the presidency of the Society of Certified Data Processors, upon Alan Taylor's resignation from that position. Martin will hold this office until elections for a new president are completed.

Taylor plans to continue work for the society on the Computer Foundation project and for other society research and development projects.

In the announcement, Taylor pointed out that he was elected for a one-year term last February, and received instructions to create a voice for the society last June.

"That mandate has been fulfilled," he said. "With the SCDP having now taken its place as a member of Codasyl, a member of the Computer Foundation Organizing Committee, and a member of the American National Standards Institute, our members certainly have a voice. In addition, our membership in Ansi Committee X3 is currently being processed."

The society has developed four draft standards which are currently being processed for adoption as Ansi standards, Taylor said.

Taylor attributed the success of the SCDP in achieving its goals to the active grass-roots membership. "We simply were not able to use all the help that was offered," he said.

Sigspac Needs Help

NEW YORK — ACM members of the Special Interest Group on Urban Data Systems, Planning, Architecture and Civil Engineering (Sigspac) interested in keeping their association alive must submit a petition to the SIG/SIC Board before April 30, 1973.

Unless a petition of 50 signatures is received by that date, the SIG/SIC Board will initiate dissolution proceedings.

Concerned Sigspac members should contact Gerald M. Sturman, chairman, Sigspac; Parsons, Brinckerhoff, Quade & Douglas, 111 John St., N.Y., 10038.

Mini Group Proposed

LODI, N.J. — An Association for Computing Machinery special interest committee on minicomputers — to facilitate sharing of user experiences with minis and provide a central information source — has been proposed here.

At least 50 signatures are needed from ACM members to form the committee.

The committee would serve as a central source where users and other interested parties could obtain information, and where manufacturers and other related companies could inform interested parties of new products and services, according to Jon R. David, who proposed the formation of the committee.

We, the undersigned members of ACM, wish to petition the ACM Council for formation of a Special Interest Committee on Mini-computers (Sicmini).

Member Name (Print)

ACM Member #

Member Signature

Address

Please mail to Jon R. David, 256 Garabaldi Ave., Lodi, N.J. 07644.

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Will they?

Just another pretty face.

This is how they introduce new computers that never were. And never will be. The old cosmetic trick.

Simple, really. All you need is a few new lights. A few new buttons. A few new knobs.

And plenty of new paint.

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New Series.

What you see
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You get Interdata's much-imitated architecture. Which means they're all upward compatible. So you get extra protection for your investment in software and peripherals.

The Model 70* has a solid-state LSI read-only-memory, built-in multiply/divide and floating point hardware and 4 channels of DMA. So it's extra powerful and flexible.

It has 113 instructions and automatic I/O and 16 g-p registers and built-in interfaces. So it's extra easy to configure and use.

The Model 80 has everything the Model 70 has. Plus a 350-nanosecond semi-conductor main memory. So it's extra fast.

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We've learned a lot in the last 5 years. Mostly from the biggies who used to delight in kicking a little sand in our face once in a while.

We learned that when you introduce a new family of processors, for example, you'd better have a bona-fide new family of processors. And not made out of cardboard, either. So we waited until we'd built the Interdata New Series before we introduced it. People believed us. And we're not about to forget that.

When it came to pricing, we learned just like everybody else — the hard way. By getting our pants

taken off in the marketplace a few times. That's something you just don't forget. Same about making promises you can't keep. We can't afford to forget that.

We even learned a lot about OEMs. Very smart. Won't pay for a lot of bells and whistles they don't really need. So we designed a special mini just for OEMs. The Model 74. Good but cheap and upward compatible with our other minis — just like the man wanted. If we ever forget that, we can kiss our OEM business goodbye.

And we learned a lot more along that hard road up.

Flexibility Puts Key-Disk Ahead

WASHINGTON, D.C. — The major advantage of today's key-to-disk systems over keypunch equipment is the flexibility the user gains, Geoffrey Thomas of the Cost of Living Council believes.

For example, he noted, the Cost of Living Council has one form with 16 different formats on it. "Could you imagine the time it would take a keypunch operator to change the drum card to new formats every time just to punch one sheet?" he queried attendees at a Caravan/73 workshop.

With the Computer Machinery key-to-disk system used by the council each of the formats can be kept on disk and called up by the local operator as needed.

He noted, however, that the Council was not the typical user since production work took a low priority in its data entry shop and a user who could batch all his work, so an operator could only be punching one format all day, might not need as much flexibility.

"But if we had had to have each operator write each format, we would have been in real trouble," he said, "and might just as well have stayed with keypunch."

In choosing equipment, he said, a vendor with local training should get a real plus, since it is often not possible to wait for a vendor to schedule a class for operators and it is expensive to send operators out for training.

At the same time, he added, it was usually a slow learning process to get operators to work effectively on the new systems, since most operators viewed the key-to-disk system as a prestige assignment and wanted to learn how to use it.

One user in the audience, however, said his installation had had a hard time converting the operators over 50 years old to using the new systems. "But once we got them used to it," he added, "they were the best workers in the shop."

Maintenance of Mixed-Vendor Systems 'Overrated' Problem

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. — The maintenance problems that can arise from mixed-vendor systems may be vastly exaggerated in order to frighten computer users from going to independently made equipment, panelists at the recent Computer Caravan/73 here indicated.

"We generally don't have problems with different equipment suppliers," according to Dr. Pat Hagerty of the University of Maryland in a talk on the selection of terminals and modems for communications systems.

Scare Tactics

"The problem," he stated, "is definitely overrated by the suppliers who want to scare you out of going to an independent vendor for equipment to attach to the Bell network."

Generally, he said, the service people from Bell and the non-Bell suppliers "get

along well and try to be helpful" in solving user problems, whether the problem is in their particular piece of equipment or in the equipment of another vendor.

At the same time, he noted, if there is any problem it is usually generated at the management level of the various firms.

But if the user is having a particular problem with a customer engineer from one company or another, Hagerty noted, the user could have him replaced if he screamed loud enough to the salesman on the account or to the management of that company.

Even though one audience member of the panel that delved into purchasing and use of independent peripherals said he had heard maintenance problems increased "as a square of the vendors involved in the shop," panelist Dave Whitestone of Potomac Electric Power Co. (Pepco) disagreed.

He said that so far — and Pepco has been using independent equipment since 1969 — "all vendors have been extremely cooperative," when it comes to maintenance problems.

If there were any problems, however, they would probably arise right at the start of the use of the new equipment, he said.

"It's going to take some time for you to get all of the vendor's service people to work together," he noted, "but once they get used to the mixed-vendor shop the problems are really minimal."

Users Differ on How To Pick, Train Staff

WASHINGTON, D.C. — Even though users spend the largest part of their budgets on personnel, there seem to be no clearcut guidelines on how to select and train them.

Most of the users at a Caravan/73 session here related different ways of dealing with the same problems, with little common threads in their management approaches to the subject, except for the desire to improve their personnel management techniques.

At the same time, few of the users indicated they currently had any formal in-house training programs for either new or old personnel — but once again they indicated a desire to improve this process.

In the selection and training areas, workshop leader G.D. Springer gave users a multipoint program to use for recruiting people and then training them after they were hired.

But, he warned, any guidelines for personnel handling have to be made to fit the particular installation's needs and the personnel involved and cannot be applied across the board to all installations or to all personnel within an installation.

The first priority when considering adding personnel or replacing people who have left is to discover whether there is a real need for the position, he noted.

Secondly, a firm should take a hard look at the job description and set the requirements in writing.

Next, the firm should establish the salary range for the position and set a maximum starting level. In too many cases, he said, a firm will go over what it really wanted to pay as a starting salary because it is desperate to get someone in the job, but, he said, this only causes problems later with present employees or with the new employee at review time.

A computer installation should also carefully develop its screening and interview techniques and should establish a method to test prospective employees at levels beyond the general aptitude tests.

After hiring a new employee, the manager should set an evaluation period or several evaluation periods to make sure he is performing the job expected.

What the industry taught us about minicomputer pricing.



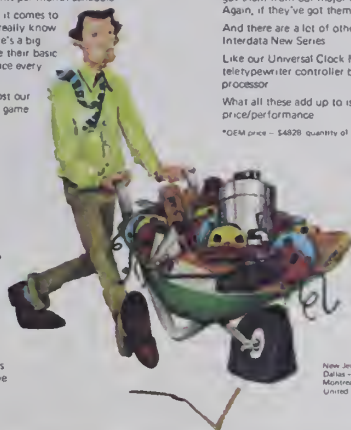
We've learned the hard way.

Step right up, fans. Here's the greatest little dollar-saver to ever come down the pike. Cycle times too fast to measure. Memory too fast to quit. All for a price so amazingly low that it defies the laws of economics.

Terrific. Until you realize they're talking about a processor so stripped down it won't even hum by itself. Its assembly may be your next do-it-yourself project. Except for the tic-tac-toe game, the software won't work without 16 K-B more memory and enough peripheral gear to triple your costs. And the discount they used was based on a 1000 unit-per-month schedule.

No question about it. When it comes to minicomputers, some guys really know how to play price. And there's a big difference in how they price their basic processors and how they price every thing else.

We ought to know. We've lost our knickers in the trick pricing game often enough to be experts.



Promise them anything.

We've learned that you can make a lot of promises.

About delivery, for example. "For a customer as important as you, we'll cut our 9-month shipping schedule in half." About documentation. "We don't have all the manuals yet, but we'll work that out together." And about customer engineering. "Of course we'll assign a full-time man to the Isle of Wight."

But what we've really learned is we don't have to make promises we can't keep. We don't do business that way. We just don't have the stomach.

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What you get from Interdata when it comes to pricing is something extra. Extra value.

Extra processor facilities, for example. With our Model 70,* you get hardware multiply/divide. Built-in 32-bit floating point arithmetic. Privileged instructions. 4 direct memory access ports. Automatic I/O. And 16 general registers.

All for no charge. With other manufacturers, these facilities either cost you extra or are not even available.

From Interdata you get extra reliable memory modules designed in-house for each specific model. With or without parity. With or without automatic memory protection. And they cost you less than if you got them from our major competitors. Again, if they've got them.

And there are a lot of other extras about the Interdata New Series.

Like our Universal Clock Module. And our teletypewriter controller built into our basic processor.

What all these add up to is extra price/performance.

*GEM price — \$4826 quantity of 15.



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We're ready to demonstrate for you now. Not 9 months from now. We'll even run a benchmark for you.

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Like how to make true DC processors instead of modifying GP processors for Data Communications people. Like how to put together a family of software packages that really work before we started peddling them. Operating systems like RTOS, DOS, BOSS and a telecommunications operating system, RTEK. And like how to put a well trained and equipped service network in place before we beat the bushes in East Oshkosh.

Some of our lessons were painful. Maybe that's why they stick. Maybe it's because we know if we hadn't learned, we never would have made it.

And maybe because we plan to grow even faster, we know we'll have to learn a lot more than we know now. And get a lot smarter about how to do a better job for our customers.

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L'EXPOSITION

L'exposition est une occasion unique de découvrir les dernières technologies et de partager vos expériences. C'est une occasion unique de vous tenir au courant des dernières tendances du marché et de rencontrer les personnes qui font la différence.

| City | Dates |
|------------|----------------|
| PARIS | 2, 3, 4 MAI |
| BORDEAUX | 7, 8, 9 MAI |
| MARSEILLE | 15, 16, 17 MAI |
| LYON | 22, 23, 24 MAI |
| STRASBOURG | 29, 30, 31 MAI |
| BRUXELLES | 5, 6, 7 JUIN |

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Computerworld's French market Computer Caravan is a French show. Because it's being co-sponsored by the leading French Computer publications, *Zero-Un Informatique*. With the leadership of *Zero-Un*'s widely respected monthly magazine and weekly newspaper, French market computer users will know they're getting an Exposition that is uniquely theirs. We'll be conducting The Caravan in local hotels, and orienting the user Forums to accommodate the needs of French market users.

This combination of French control, French publicity and user-orientation will draw thousands of important EDP buying influences as we travel to six cities in 2 countries. And these people are part of one of the most rapidly growing computer markets in the world. Here are some of the figures, according to a recent survey by International Data Corporation:

Overall 1971 EDP Expenditures \$1.48 billion
Projected increase for 1972 8.1% (1.6 billion)
Projected increase for 1973 14.5% (1.83 billion)

Submarket projections:

Data Entry equipment (especially key-to-tape, key-to-disc) is projected for a 28% increase in 1973.

Data Communications Terminals and Control Equipment expenditures are expected to go up 40% in 1973 to a total over \$27 million.

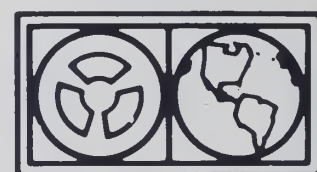
Independent Peripheral Equipment expenditures are expected to increase markedly in 1973, partially as a result of newly expanded marketing operations.

If you're marketing in Europe — or if you want to be — "La Caravane" is a sales tool you shouldn't pass up. If you'd like the details, just send in the coupon or call Neal Wilder at (617) 332-5606.

French Market Caravan Schedule

| Dates | City | Site |
|-----------|------------|-------------------------|
| May 2-4 | Paris | Hotel PLM Saint Jacques |
| May 7-9 | Bordeaux | Palais Des Expositions |
| May 15-17 | Marseille | Palais Des Congres |
| May 22-24 | Lyon | Palais Des Congres |
| May 28-30 | Strasbourg | Palais Des Expositions |
| June 5-7 | Brussels | Palais Rogier |

Package Price: \$9000



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Please send me more details — including market facts and brochure — on The European Computer Caravan's which I have checked.

- ☐ French Market Caravan
☐ English Market Caravan
☐ German Market Caravan

(May 2-June 7)
 (Sept. 4-Oct. 18, 7 cities)
 (Oct. 30-Nov. 30, 5 cities)

Name _____

Title _____

Company _____

Address _____

Zip _____

CI Notes

DP May Rank Number 2

STAMFORD, Conn. — New sectors of the telecommunications industry may be on their way toward displacing the computer industry from its role as the "most dynamic, influential industry of the decade," according to a report by the Business Communications Co.

While still much smaller than the \$2 billion/year voice service business, known as Plain Old Telephone Service, the combined new sectors are growing four to five times as fast as the older one, and sales should reach \$5.6 billion/year by 1977, the report stated.

The fastest growing sector is new services, including new common carriers, domestic satellites and CATV, at a 39% annual rate, while digital equipment is second, with a 28% rate. The report projects in 1977 installed equipment for this field will be valued at \$6.1 billion. The other categories include voice-independent "interconnection," and other equipment, such as facsimile units. BCC is at 471 Glenbrook Road, 06906.

Siemens to Buy Computest

CHERRY HILL, N.J. — Siemens Corp. has agreed in principle to acquire Computest Corp. for cash. Computest management and operation will remain unchanged.

This marks the second DP-oriented acquisition by a German firm since November, when Nixdorf announced plans to acquire Victor Comptometer Corp.

Supershorts

An agreement between Decision Data Corp. and International Engineering Ltd. (IEL) is designed to provide Decision with European manufacturing capabilities this year. Decision has agreed to invest \$600,000 in IEL, a Northern Ireland firm, and has an option to acquire up to a 50% interest.

The first Army installation in the World Wide Military Command and Control System (Wimmix) has accepted a dual Honeywell 6050 system. Fourteen systems were delivered in 1972.

Delta Data Systems has been added to the General Services Administration's approved list of company products for purchase by government agencies.

Univac has selected Intel Corp. to supply its 1103 semiconductor memory systems. The initial contract is valued at over \$1 million, and contains options for the purchase of additional memory systems.

Computer Automation, Inc. has appointed Geveke Elektronika en Automatie N.V. as its distributor in the Benelux nations.

Time/Data Corp. has appointed Tokyo Electron Laboratories Inc. as its representative in Japan.

Microdata Corp. has assigned Teijin Advanced Products Corp. Japanese marketing rights for the Microdata 1600 and 400 product lines.

High Performance Technology, Inc. of Midland, Mich., has reopened its single crystal production facility. The company has undergone a complete reorganization of its management and capital structure since it was closed in October.

The Sperry Remington Division of Sperry Rand intends to take a license from Redactron Corp. to manufacture editing typewriters.

IBM-Telex Documents

CIA Would Make Suit Papers Public

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. — The Computer Industry Association (CIA) has charged that IBM is attempting to keep documents secret that should be in the public record in IBM's current antitrust suit with Telex, which is slated to go to trial here April 16.

A week ago the association asked to see 25 documents that were filed as part of the case and which the association said concerned internal IBM projections of the effect of certain marketing moves on the competition and on IBM's future business.

Telex indicated it had no objection to the documents being released to the association, the press and the public. However, IBM objected to their release and said it would like to have time to inspect the papers before they were released.

After inspecting the documents over a weekend, IBM contended that all of them except three contained trade secret information and asked Judge Sherman A. Christensen that the documents not be released.

However, the Computer Industry Association last week filed a response to the IBM request, in which it asked Christensen to make the contested documents public immediately and to prevent further "subterfuge" in handling of documents in the antitrust case against IBM.

Competitive Dealings

The IBM request to Christensen cited the fact that the documents were submitted under protective rulings by two other judges, an IBM spokesman said. The documents "sought by the CIA contain confidential information concerning IBM's products and business that should not be made available to competitors, such as members of the CIA," he said.

"It's apparent that the primary purpose of the CIA is to generate prejudicial publicity concerning the antitrust cases

pending IBM, and in light of the closeness of the Telex trial and the potential problem posed by such prejudicial publicity, IBM submits that it is not useful or desirable to facilitate the publicity seeking efforts of the CIA," the spokesman said.

The CIA has charged that the contested documents do not contain trade secret information but rather contain only information on IBM marketing projections and forecasts of the effect of certain moves upon the competition.

The moves considered in the documents are said to include the changes in memory and CPU prices outlined in an IBM memo attributed to T. Vincent Learson and the proposed effect of the longer-term lease plans that IBM was considering at the time.

"We want to make sure that these documents are not destroyed like the data base was in the Control Data-IBM case," according to CIA President Dan McGurk, "and that is why we have asked for them to be released publicly."

"Making them public is the only way to make sure they will not be lost to the industry and the public at large," he indicated.

In addition, McGurk said that from the titles of the documents it was impossible to see how they contained any trade secret information, and he indicated it was likely that IBM was only using the trade secret argument as an excuse to keep embarrassing information from public release.

How Secret?

The most important argument in the CIA request, sources said, is the charge of secrecy of documents in the case. The IBM move to keep documents secret — so closely on the heels of the criticized data base destruction in the Control Data-IBM settlement — seems to suggest, they said, that there is a great deal of information in the documents attached to the case that could be harmful to IBM's case or at least to its image.

Opposition Is Certain to Bell Plans To Restructure Private Line Rates

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. — AT&T's plans to restructure its private line tariffs (Story on Page 1) will surely be contested by the specialized common carriers and the Federal Communications Commission.

To change its rates AT&T will have to justify that the proposed charges cover its costs or are "fully compensatory," as Bell claims.

In its request to file the proposed changes, AT&T has told the FCC that the total revenue it gets from private lines will be redistributed to more accurately reflect its costs. But there will undoubtedly be questions for Bell to answer.

For years Bell has provided private lines at \$3/mile and now it says it can provide those same facilities in highly populated (high-density) areas for only 85 cent/mile. It will be important for AT&T to document how these changes are justified

Analysis

from an accounting standpoint.

It is no coincidence that the lower rates duplicate the routes where MCI and the other specialized carriers plan to operate. An MCI spokesman said the FCC will have to be sure that AT&T is proposing to compete fairly.

Under its now-famous 18920 ruling in 1971, the FCC said existing carriers will be allowed to compete with the specialized carriers so long as they do so "equally and fairly."

If Bell's proposed changes are not allowed to take effect, long-distance telephone users will have to pay \$100 million more annually by 1976 because of the private line revenue that will be lost, according to Richard R. Hough, president of AT&T's Long Lines Department.

Under the existing private line rates Hough estimated AT&T will lose \$200 million to specialized common carrier competition by 1976.

AT&T figures for 1971 show private line revenues of \$185 million. So Hough's estimates indicate Bell would lose more than the value of its current revenues if the present rates were to remain.

When asked why it would take only \$100 million in added revenue to make up an estimated loss of twice that amount, Hough said the difference of \$100 million was the value of AT&T's facilities allocated to private line services.

Based on these estimates, it appears that AT&T is dedicating \$100 million in network resources to generate \$185 million in revenues. It would then follow that the bulk of AT&T's subscribers is doing without \$100 million of network facilities so that 19,400 private line users can enjoy lower rates than dial-up customers.

AT&T has told the FCC the proposed rates "more closely reflect the cost of providing the [private line] service." Before any FCC approval is given to restructure the interstate voice-grade private line rates, the costs of that service will come under very close scrutiny.

Caravan/73: a Sales 'Happening'

By a CW Staff Writer

WASHINGTON, D.C. — Now that the Computer Caravan/73 has visited two cities on its 10-city tour, exhibitors are ready to talk about the results of the show so far.

"We've seen one and a half to two times the number of people we saw in each city last year," according to Paul Lobel, marketing manager for Penril Data Communications.

"And," he added, "the quality has been twice as good as last year. In fact in Boston we sold enough equipment right off the floor to pay for the expense of being in that city — something we never did last year."

Small World

Lobel said two of the Boston sales came from people whom Penril had not been courting before the show.

"We didn't know they existed, but they came to the show and signed orders that were worth \$10,000," he said.

The first sale of the show was made by Iomec representative Bob Martel, who just 45 minutes after the show opened in Boston closed an order he had been pursuing.

"We were working on this order," he said, "but the show atmosphere really helped to put it over the top. The customer could come in here and see the equipment working along with the rest of our line. He was impressed, and the show atmosphere helped impress him."

In addition, Martel said contacts gained

at the Boston show "will have me tied up solidly for the next two weeks — and these aren't guys just shopping around, they want to talk turkey and are ready to sign contracts."

But direct sales aren't the only reason given by some exhibitors for being in the Caravan.

Increase Presence

"This show is helping us increase our presence in the various cities and regions around the country," according to Dallas Talley, marketing vice-president at General Computer Systems, a key-to-disk maker.

"Some users," he admitted, "have not really heard of us before. But if the results of Boston hold up — and I think they will — a lot more of them will be aware we are around when they look for data entry equipment."

In fact, Talley indicated his firm had talked to several users who were presently using or planning to get someone else's equipment. "We may have changed a few minds," he noted.

It is difficult, if not impossible, to put a dollar figure on the sales made so far this year as a direct result of the Caravan, but all exhibitors interviewed said they were seeing more good contacts this year than last — most indicating the number had doubled so far.

And last year, several firms sold over \$1 million as a result of the Caravan, with one reporting sales of \$2.5 million. This year might see those figures broken, exhibitors agreed.

Computer Users' Forum Registration

Name _____
Title _____
Company _____
Address _____
City _____
State _____ Zip _____

1. Please circle one number in each category.

(This information is necessary to provide a better forum for you.)

YOUR INDUSTRY

- 01 Mining/Construction/Oil & Refin.
- 02 Manufacturing—Computer or data system hardware, peripherals/other associated mechanical devices
- 03 Manufacturing (other)
- 04 Utilities/Comm. Sys./Transport.
- 05 Wholesale/Retail

- 06 Finance/Insurance/Real Estate
- 07 DP Serv. Bureaus/Software/Plann.
- 08 Business Services (except DP)
- 09 Education/Medical/Legal
- 10 Federal, State and Local Govt.
- 12 Communications/Printing/Publ.
- 13 Other: _____

YOUR FUNCTION

- 01 Corporate Officer
- 02 Data Processing & Other Operational Management
- 03 Data Processing Professional Staff
- 04 Consultant

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- 08 Librarian/Educator
- 09 Other: _____

2. Please check the appropriate city:

| | | |
|------------------|-------------------------------|--|
| Washington, D.C. | Feb. 20-22 (Tues, Wed, Thur) | Sheraton-Park Hotel |
| New York | March 5-7 (Mon, Tues, Wed) | New York Hilton |
| Atlanta | March 13-15 (Tues, Wed, Thur) | Regency-Hyatt House |
| Houston | March 20-22 (Tues, Wed, Thur) | Hyatt-Regency Houston |
| Anaheim | March 27-29 (Tues, Wed, Thur) | Disneyland Hotel |
| San Francisco | April 3-5 (Tues, Wed, Thur) | Civic Auditorium (Forums & Exposition) |
| | | Del Webb Towne House (Hotel Rooms) |
| | | Municipal Auditorium (Forums & Exposition) |
| | | Muehlebach (Hotel Rooms) |
| Kansas City, Mo. | April 11-13 (Wed, Thur, Fri) | Conrad Hilton Hotel |
| Chicago | April 17-19 (Tues, Wed, Thur) | Convention Center (Forums & Exposition) |
| Cleveland | April 24-26 (Tues, Wed, Thur) | Sheraton Cleveland (Hotel Rooms) |

3. Check the day(s) you will attend the Forums.

- ☐ Day 1—Data Entry—9 am-2:30 pm
- ☐ Day 2—Data Communications—9 am-2:30 pm
- ☐ Day 3—Installation Management—9 am-2:30 pm

NOTE: Afternoon Sessions are open to all—free of charge.

4. Your enclosed check will cover all workshop materials, luncheon, Forum admission and admission to the Exposition Hall (make checks payable to "The Computer Caravan")

- ☐ One Day—\$25.00
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Day 2—Communications

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- Data Transmission
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- Equipment Selection
 - a) communications processors
 - b) control equipment (terminals, modems)

Day 3—Installation Management

Panel discussion on management aspects and workshops on specific techniques in the following areas:

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- Independent Peripherals
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 - b) other peripherals



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- Day 3—Small Systems Panel

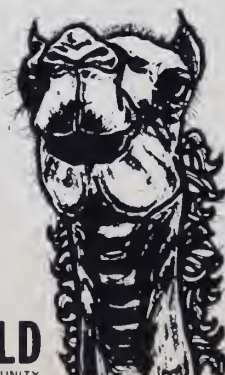
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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY



Changing User Needs Expected to Govern Future of Data Entry System Business

By E. Drake Lundell Jr.

Of the CW Staff

SANTA MONICA, Calif. — User needs and not technology should govern the future of the data entry business, according to Peter Zinsli, vice-president of Computer Machinery Corp. here.

Because of this, he said, the present "mixed-media" data entry systems do not have a lot of validity since they don't meet the present user's needs efficiently.

At the same time, he indicated there will be a market for such systems in the future since user needs will be changing over the next few years — but "it's not the time now."

OCR will have to be used more in the future, because the amount of data to be entered in computer systems will grow by four times by 1980 and not all of this growth can be met by key entry systems such as the ones produced at CMC, he said.

"When the user meets these problems of increased input requirements, then he will need the new systems." CMC will probably offer some type of "mixed-media" system in the future, he said, when users reach a point where they need such devices.

Users will move to such devices or to OCR not as a group, he said, but rather by industry or application area as they are forced to by their growing workloads for data entry.

About the Market

Zinsli does not expect the market for key entry equipment to level out in 1974 or 1975, as some industry researchers have predicted.

"There is a big unknown in their equations," he said, "and that is on what IBM plans to do. But I don't see much reason for the growth to level out."

By the end of 1971, he indicated, the key-to-disk makers had only penetrated 1.7% of the potential market and IBM was still shipping 5,000 129 keypunches monthly. Even with half of these being netted out — replacing existing installations — that still meant 2,500 new key-punch installations each month by IBM alone, he noted, which in turn indicates a growing market for the key-to-disk makers, not a stationary or shrinking one.

He also reported that CMC had gained the lead in the key-to-disk marketplace both in terms of the value of equipment installed and the number of units in the field over its closest competitor, Inforex.

At the end of 1972, CMC had 13,000 keystations installed, he said, compared to 12,000 for Inforex; 2,500 for Honeywell and 3,500 for the rest of the industry.

On an if-sold basis, the CMC equipment installed was valued at around \$92 million, he said, compared with Inforex with \$50 million to \$60 million in installed equipment.

Presently CMC is producing 600 keystations monthly, he said, and the average size of a system being installed is around 10 keystations.

CMC 5 systems average 10 keystations, CMC 9s average 15 keystations and the first deliveries of the CMC 18 are averaging 22 to 24 keystations, which will raise the average system size when volume deliveries begin, Zinsli added.

The CMC business is divided about equally between its U.S. business and foreign operations.

The European market is highly fragmented by country, he indicated, with

some of the nations tending to have highly centralized data entry operations and others having decentralized operations.

For example, Zinsli stated that in France only 20% of the shops operate with one to eight keystations, while in Germany, which is highly decentralized, 40% of the shops have between one to eight keystations. In the U.S., by contrast, 30% of the installations have one to eight keystations, and in the UK the number is 38%.

Surprisingly, even though key-to-disk systems are primarily sold on the idea that they can reduce people costs in the U.S., the systems are also becoming popular in Japan with its lower labor rates, Zinsli related.

He also noted that the Japanese bought larger configurations for more centralized operations with 32 more keystation systems being sold overseas than here.

The Japanese are interested in productivity," he said, "so they buy this type of system for the increased productivity, even if it might not save them a great deal over their keypunching costs."



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Intel Unit to Lease 370s

SAN FRANCISCO — Intel Corp. has set up a subsidiary, Intel Investment Management Corp., for purchasing for lease about \$40 million of IBM 370 central processors and peripheral equipment manufactured by Intel and others.

The subsidiary has filed with the Securities and Exchange Commission to offer Limited Partnership Units, \$10 million of which will be offered to the public. The remaining funds have been tentatively arranged with commercial banks.

360 Add-Ons 'Strong,' But 370s Cast Long Shadow

By Molly Upton
Of the CW Staff

BOSTON — The 360 add-on memory market, although admittedly "strong," according to a recent survey of manufacturers, is being overshadowed by the glamor of the 370 market.

Some makers are finding their production facilities hardpressed to keep up with the 370 demand, and marketing forces may be overlooking some areas in the 360 market in efforts to place well in the 370 race.

The 360 market, described as "getting more competitive every day," by Chris Gordon, New England district manager of Computer Investors Group, is "stronger than our optimistic forecasts had predicted," according to Bob Hengen, marketing vice-president of Cambridge Memories.

Refusing Orders

The 360 demand is so great that Gordon said CIG has had to turn down some orders, as Data Recall, the manufacturer,

is concentrating exclusively on making 370 boxes now. Gordon explained that in short-term rentals it is difficult to recover costs, and the firm prefers to handle depreciated boxes coming off-rent.

Current inventory is sufficient to handle demand, he added.

Ampex, Electronic Memories and Magnetics and Cambridge Memories are all making new boxes for the 360 series.



CW Photos by M. Upton
Gordon

Although there was some difference of opinion as to which 360 models are more susceptible to inroads from the 370s, there was general agreement that "we'll

CW Inquiring Photographer

pick up the customer when he gets to the 370."

To Larry Bellman of Ampex, the 360 add-on market looks concrete, although he feels the Model 30 user is likely to go to the 370/125, with the majority of the volume existing in the 40, 50 and 65 range.

John Reardon of EM&M noted the demand for 40 add-ons had slowed down some, which he attributed to upgrading to the 370/145.

'Spooky' Business

The 360 business is "spooky," according to Hengen, as it runs serially by model



Bellman

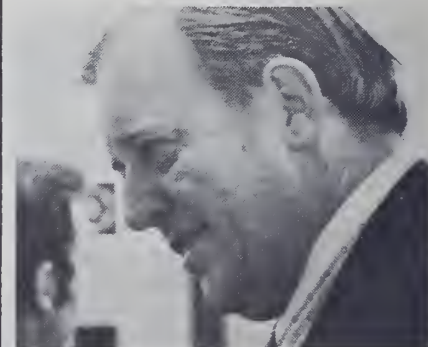
rather than in a parallel fashion. "We get runs of orders by models that defy reasoning. For instance, demand can be great for 65s and 22s, and then alternate to 40s or big 30s," Hengen said.

Cambridge is receiving orders for larger amounts of memory, but the volume is roughly the same as it has been, he said.

Possibly this is because Cambridge isn't touching as many bases as it might in the 360 market due to booming 370 business, Hengen admitted.

The market for the Model 30 "looks very good," noted Hengen, who called the 30 "still the best doggone machine put together."

The argument over whether IBM would maintain CPUs with extended memory did cause some cancelled and delayed orders, the men conceded, but they said



Reardon

the volume returned as soon as the issue was settled.

CIG offers 2M bytes for the 155 and will have 4M bytes for it, according to Gordon. This, with a DAT box, he suggested, could give the user the equivalent of a 370/158.

EM&M is beginning initial deliveries of up to 3M bytes for the 155 and 165, Reardon said.

The 370 market is taking "every bit we can produce," observed Hengen of Cambridge, who noted his firm is shipping units for the 155 and 165, and expects to begin shipping units for the 145 in June.

Some Disagreement

The effect of the recent IBM announcement on the expansion of the 145 memory was also interpreted differently [CW, Feb. 7].

Reardon said EM&M is "not concentrating" on the 145 market, as IBM just "bundled" up to 1M byte of core in the unit, which previously was available with 512K.

But Hengen said he thought this move by IBM probably broadened the market, although it left the add-on memory makers in a "less unique position." "We don't have to engineer the extension," he added.

IBM also stabilized the market, in Hengen's view, since he felt the users had not "bought the idea that 'the real 370' had stood up."

Hengen expects an accelerated move to the 370 now.

Although more companies are entering the memory arena, Hengen sees the market "holding up very nicely," with room for four or five good size memory companies. Probably the secret to success is to become more in tune with the systems companies and operate their businesses less like a semiconductor outfit and more like a computer company, he concluded.

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Japan Business Leaders Unite to Seek Liberalization of Computer Imports

Special to Computerworld
From Shukan Computer

TOKYO — Japanese business and industrial leaders have called upon the government to take drastic measures — including liberalizing computer and integrated circuit imports — “in several months in order to reduce the nation’s huge trade surplus.”

The decision was made at an emergency meeting of leaders of the Federation of Economic Organizations (Keidanren).

This is the first time that Keidanren, the nation’s most influential economic organization, has formally called for the liberalization of such items as computers and some farm products.

Japanese computer makers were shocked at the Keidanren leaders’ decision.

According to industry sources, the makers had just decided earlier last week there was no reason for decontrol of imports of computers at present because foreign-made machines already hold a 50% share in the nation’s market.

Further, they asked the Japanese Government last week not to liberalize computer imports until

their five-year plan to develop new machines ends in 1976, the sources said.

The main points of the Keidanren plan are:

- The government should keep the yen floating so it may find an appropriate margin for revaluation through interactions of actual market forces.
- The government should liberalize imports of such “items of international interest” as computers and farm products, by taking measures to mitigate imports upon domestic industries. Imports of goods which are still placed under restraints should also be expanded.
- Tariffs on industrial products should be largely reduced even before new international negotiations on across-the-board tariff cuts is launched.
- Japan should strive for complete liberalization of international capital transactions. Concerning domestic industries which cannot yet afford to meet complete liberalization, the government should set a specific date for the 100% liberalization of foreign investment.
- A new law should be enacted to enable the government to respond to rapid changes in economic situations.

Microprogramming Coming Into Vogue, Costs Seen Dropping

SAN FRANCISCO — Microprogramming has become a highly practical reality through the use of advanced semiconductor technology in control memory design, Microdata President Donald W. Fuller told a group of security analysts recently.

But the full force of the technique, recognized as a theory with great potential 20 years ago, is only beginning to be felt.

On the Bandwagon

Almost every computer maker has incorporated microprogrammable computers in the product line, he noted.

“No wonder, when you realize what microprogramming can do for the user as well as the manufacturer. The cost of developing new computer architectures is the lowest ever,” he said.

The manufacturing cost for a family of related models has dropped dramatically as have costs for training and servicing. And with microprogramming, software can be fully protected from theft by the competition,” Fuller said.

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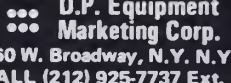



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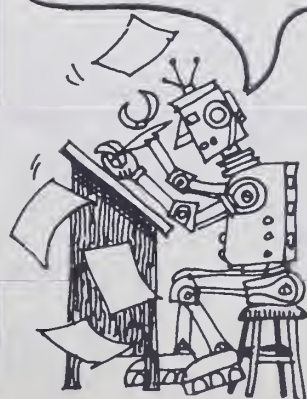
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Nickels & Dimes

Good Riddance Department: RCA expects to report record sales and earnings of over \$2 a share in its first full year since disposing of its computer entity. "The results validated the correctness of that decision," Chairman Robert W. Sarnoff said. "Our managerial and technological resources, freed of the computer drain, were mustered in support of our continuing operations, with priorities going to the most vigorous growth segments..."

\$\$\$

United Telecommunications will pay its first dividend of 25 cents per common share on March 28 to stockholders of record Feb. 28.

\$\$\$

The sale of forms continues to increase in importance for Data Documents, which indicated in

the first quarter standard cards represent less than 60% of sales while forms now account for about 25%.

\$\$\$

Sales of Applications Software's ASI-ST data management system exceeded \$2 million earlier than had been anticipated, because of sharp acceleration in recent months.

\$\$\$

Wiltek, communications equipment maker, has completed a private placement of convertible subordinated notes in the amount of \$2 million with three institutional investors.

\$\$\$

Computer Consoles has signed a one-year loan agreement with Marine Midland Bank-Rochester for up to \$2 million to finance construction and leasing of its Data Management Systems.

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\$70 Million Write-Off

NCR Reveals \$59.6 Million Loss for '72

DAYTON, Ohio — A \$70.1 million write-off, added to the poor first quarter resulting from a strike the previous year, has caused National Cash Register Co. to record a loss of \$59.6 million for the year.

Earnings for 1971 totaled \$2.1 million or 8 cents a share. Revenue in 1972 rose to \$1.56 billion, up 6% from \$1.47 billion in 1971.

Operating earnings prior to the charge were improved, totaling \$10.5 million, and revenue from computer rental and sales rose 17% to \$250.8 million. Computer shipments were up 17% from 1971, the firm said.

Transition

The company has changed its method of depreciating plant, manufacturing and rental equipment to the straight-line method

Suit Questions REI Earnings Reports

DALLAS — A suit has been filed in the U.S. District Court for the Southern District of New York charging Recognition Equipment Inc. with overstating its sales, profits and net assets in financial statements and other reports issued between October 31, 1969, and July 1, 1971.

Plaintiff Michael Rifkin, allegedly a purchaser of REI stock, charged the firm with violations of Section 10(b) of the Securities Exchange Act of 1934.

REI said the reports in question "reflected accepted accounting practices and made full and proper disclosure," and that the claims will be "vigorously resisted."

for additions beginning in 1972.

It is also cutting the estimated useful life of rental equipment to five years from six. NCR has changed to the "first in, first out" method of inventory evaluation.

NCR expects a profitable year in 1973, with improved results from the computer business due to a growing customer base.

The charge reflects a write-off

of previously deferred marketing costs, a restatement of parts inventories, costs of realigning and equipping manufacturing facilities in connection with a transition from mechanical cash registers to new electronic products, according to NCR.

The fourth quarter contributed \$10.1 million of the operating profit, in contrast with a \$15.7 million loss in 1971.

Interdata Earnings Jump in Year As Revenues Show Rise of 46%

OCEANPORT, N.J. — Quantity sales of Interdata Corp.'s New Series minicomputers were credited with the substantial rise in earnings and revenues for the year ended Dec. 31.

Earnings, including a \$349,700 special credit, rose to \$894,900 or 45 cents a share compared with \$45,200 or 3 cents a share last year. Revenues reached \$12.8 million, a 46% jump from \$8.8 million in 1971.

"Of major significance was the move by major corporations to begin purchasing our products in large quantities, thus permitting us to realize increased production efficiencies," President Daniel Sinnott said.

Backlog reached \$4.7 million in the fourth quarter compared with \$3.2 million at the end of

1971.

Sinnott noted that the earnings growth occurred despite an \$85,000 charge as a result of reducing previously capitalized research and development.

"Furthermore, we are targeting a substantial improvement in 1973 net income despite the fact that the company will charge the remaining \$460,000 of previously capitalized R&D to operations during the year. The company does not plan to capitalize any 1973 R&D expenditures," he said.

In the fourth quarter, earnings totaled \$200,200 or 9 cents a share compared with \$158,100 or 9 cents a share in the comparable year ago period.

Revenues rose to \$3.5 million from \$2.5 million.

Ampex Posts Profitable 3d Quarter

REDWOOD CITY, Calif. — Ampex has completed its second consecutive profitable quarter and cut its long-term debt by \$71 million in the 15 months since a management change.

In the third quarter ended Jan. 27, operating earnings totaled \$1 million or 10 cents a share before a special gain of \$2.8 million, for a total of \$3.8 million or 35 cents a share. Revenues totaled \$74.4 million.

The special gain was derived from the sale of a subsidiary, Mandrel Industries Inc.

Comparable year-earlier results are unavailable, since auditors said the 1972 results couldn't be delineated from 1971 results. Ampex had a total loss of \$101.7 million in the two years.

Ampex showed a \$1.8 million deficit for the nine months, before the special credit produced earnings of \$904,000 or 8 cents a share. Revenues for the period totaled \$221.2 million.

Acquisitions

United Data Centers, Inc. has acquired Centralized Accounting, Inc., a Madison, Wis., based data center, for 50,000 shares of

Valley Computer has agreed in principle to merge into a wholly owned subsidiary of Tymshare,

Inc. Tymshare will issue up to 50,000 shares of its common stock.

United Data Centers stock, plus an additional number of shares to be determined in the future.

Halliburton Co. has acquired Ebasco Services Inc. and Vernon Graphics, Inc. from Boise Cascade Corp. for \$65 million cash.

Vermont Research Corp. has acquired OMI Memories, Inc. of Los Angeles, which has been merged into VRC California, a wholly owned subsidiary of Vermont. Vermont issued 61,621 shares of its common stock in return for all of the stock of OMI.

U.S. National Bank (San Diego) has acquired about 80% of the equity securities of Data Automation Co., Inc. of Dallas, after the firm's plan for reorganization under Chapter 11 was approved.

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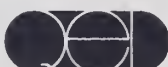
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- COMPARES THE FOUR SYSTEMS

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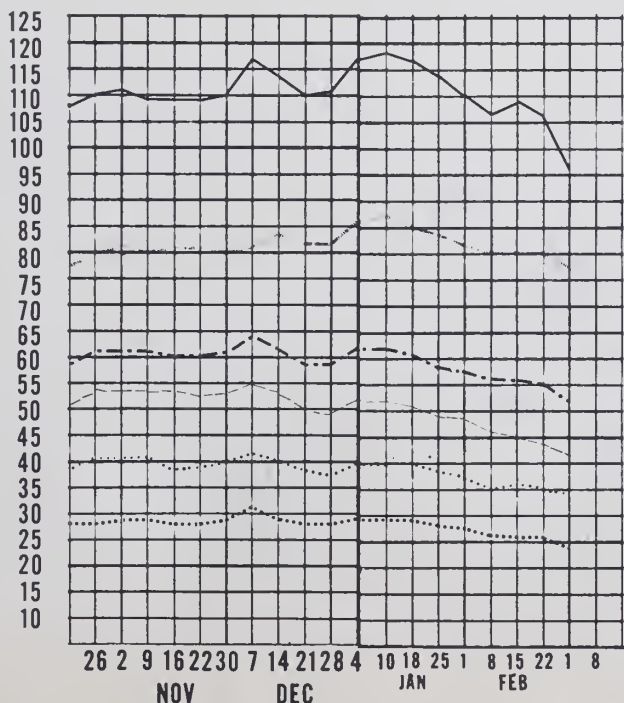
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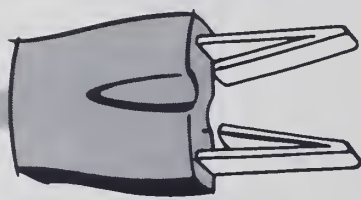
| EXCH | | PRICE | | | | |
|--------------------------|------------------------|---------|--------|--------|-------|-------|
| | | 1972-73 | | CLOSE | WEEK | |
| | | RANGE | | MAR 1 | NET | |
| | | (1) | | 1973 | CHNGE | WEEK |
| | | | | | | PCT |
| | | | | | | CHNGE |
| SOFTWARE & EDP SERVICES | | | | | | |
| O | ADVANCED COMP TECH | 1- 3 | 1 1/2 | - 1/8 | -7.6 | |
| A | APPLIED DATA RES. | 3- 7 | 3 1/8 | - 1/2 | -13.7 | |
| O | APPLIED LOGIC | 1- 4 | 2 5/8 | - 1/8 | -4.5 | |
| N | AUTOMATIC DATA PROC | 70- 99 | 73 5/8 | -2 7/8 | -3.7 | |
| O | BRANDON APPLIED SYST | 1- 2 | 3/4 | + 1/8 | +20.0 | |
| O | COMPUTER DIMENSIONS | 3- 14 | 3 3/8 | - 1/8 | -3.5 | |
| O | COMPUTER DYNAMICS | 1- 4 | 1 | + 1/8 | +14.2 | |
| O | COMPUTER NETWORK | 3- 7 | 2 1/4 | 0 | 0.0 | |
| N | COMPUTER SCIENCES | 4- 10 | 4 1/8 | - 1/8 | -2.9 | |
| O | COMPUTER TASK GROUP | 1- 2 | 1 1/2 | 0 | 0.0 | |
| O | COMPUTER TECHNOLOGY | 2- 8 | 2 3/4 | + 3/8 | +15.7 | |
| O | COMPUTER USAGE | 6- 14 | 6 1/4 | -1 | -13.7 | |
| N | COMPUTING & SOFTWARE | 10- 28 | 9 7/8 | - 5/8 | -5.9 | |
| O | COMPRESS | 1- 3 | 3/4 | - 1/8 | -14.2 | |
| O | COMSHARE | 5- 10 | 7 1/8 | - 3/8 | -5.0 | |
| O | DATATAB | 4- 9 | 3 1/2 | 0 | 0.0 | |
| O | EDP RESOURCES | 1- 8 | 1 1/2 | 0 | 0.0 | |
| A | ELECT COMP PROG | 1- 5 | 1 1/2 | + 1/8 | +9.0 | |
| N | ELECTRONIC DATA SYS. | 43- 65 | 48 5/8 | -1 1/4 | -2.5 | |
| O | INFORMATICS | 3- 11 | 3 3/4 | + 1/8 | +3.4 | |
| O | I.O.A. DATA CORP | 1- 3 | 5/8 | - 1/8 | -16.6 | |
| O | KEANE ASSOCIATES | 4- 7 | 3 3/4 | 0 | 0.0 | |
| O | KEYDATA CORP | 7- 13 | 8 1/2 | -1 | -10.5 | |
| O | LOGICON | 4- 9 | 5 1/8 | -1 1/8 | -18.0 | |
| A | MANAGEMENT DATA | 3- 10 | 3 1/4 | 0 | 0.0 | |
| O | NATIONAL CSS INC | 8- 37 | 32 7/8 | -2 3/4 | -7.7 | |
| O | NATIONAL INFO SRVCS | 1- 5 | 1 7/8 | + 1/8 | +7.1 | |
| P | ON LINE SYSTEMS INC | 8- 28 | 21 | -1 3/4 | -7.6 | |
| N | PLANNING RESEARCH | 4- 17 | 4 1/8 | - 1/8 | -2.9 | |
| O | PROGRAMMING METHODS | 20- 25 | 22 1/4 | - 1/4 | -1.1 | |
| O | PROGRAMMING & SYS | 1- 2 | 3/4 | - 1/8 | -14.2 | |
| O | RADIO DATA INC | 5- 27 | 21 1/4 | 0 | 0.0 | |
| O | SCIENTIFIC COMPUTERS | 1- 4 | 1 1/4 | - 1/8 | -9.0 | |
| O | SIMPLICITY COMPUTER | 1- 5 | 2 7/8 | - 1/8 | -4.1 | |
| O | TBS COMPUTER CENTERS | 3- 6 | 3 1/4 | 0 | 0.0 | |
| O | TCC INC | 1- 3 | 3/8 | - 1/8 | -25.0 | |
| O | TYMSHARE INC | 7- 12 | 7 5/8 | - 1/4 | -3.1 | |
| O | UNITED DATA CENTER | 5- 8 | 5 1/4 | - 1/4 | -4.5 | |
| N | UNIVERSITY COMPUTING | 7- 26 | 9 1/8 | -2 1/4 | -19.7 | |
| A | URS SYSTEMS | 6- 10 | 5 5/8 | - 1/4 | -4.2 | |
| PERIPHERALS & SUBSYSTEMS | | | | | | |
| N | ADDRESSOGRAPH-MULT | 27- 49 | 22 3/4 | + 1/8 | +0.5 | |
| O | ADVANCED MEMORY SYS | 12- 23 | 16 5/8 | -1 3/4 | -9.5 | |
| N | AMPEX CORP | 5- 15 | 6 1/4 | - 1/4 | -3.8 | |
| O | ANDERSON JACOBSON | 4- 8 | 5 3/4 | - 1/8 | -2.1 | |
| O | BEFHIVE MEDICAL ELFC | 1- 8 | 6 3/4 | + 5/8 | +10.2 | |
| A | BOLT, BERANEK & NEWMAN | 5- 21 | 8 3/4 | - 1/4 | -7.7 | |
| N | BUNKER-RAMO | 7- 14 | 7 1/2 | - 1/4 | -4.2 | |
| A | CALCOMP | 9- 25 | 11 1/2 | - 1/2 | -4.1 | |
| O | CAMBRIDGE MEMORIES | 9- 15 | 10 5/8 | + 1/8 | +1.1 | |
| O | CENTRONICS DATA COMP | 6- 28 | 21 1/2 | +2 1/4 | +11.6 | |
| O | CODEX CORP | 6- 25 | 13 | -1 1/4 | -8.7 | |
| O | COGNITRONICS | 3- 5 | 1 1/2 | - 1/8 | -7.6 | |
| O | COMPUTER COMMUN. | 1- 7 | 2 1/2 | - 1/4 | -9.0 | |
| A | COMPUTER EQUIPMENT | 2- 4 | 2 | - 1/4 | -11.1 | |
| O | COMPUTER MACHINERY | 7- 13 | 10 1/8 | - 7/8 | -7.9 | |
| O | COMPUTER TRANSCIVER | 2- 9 | 2 3/4 | - 3/4 | -21.4 | |
| A | COMPUTEST | 3- 9 | 4 1/2 | 0 | 0.0 | |
| N | CONRAC CORP | 24- 39 | 23 1/2 | - 1/4 | -1.0 | |
| A | DATA PRODUCTS CORP | 3- 7 | 3 3/8 | - 3/8 | -10.0 | |
| O | DATA RECOGNITION | 1- 5 | 2 1/2 | 0 | 0.0 | |
| O | DATA TECHNOLOGY | 2- 5 | 3 7/8 | 0 | 0.0 | |
| O | DI/AN CONTROLS | 3- 8 | 3 3/8 | - 3/8 | -10.0 | |
| N | ELECTRONIC M & M | 3- 8 | 4 1/8 | 0 | 0.0 | |
| O | FABRI-TEK | 2- 5 | 3 1/2 | - 3/8 | -9.6 | |
| O | GENERAL COMPUTER SYS | 6- 16 | 8 1/4 | - 1/4 | -2.9 | |
| N | GENERAL ELECTRIC | 59- 74 | 66 1/4 | -1 5/8 | -2.3 | |
| N | HAZELTINE CORP | 7- 13 | 6 1/2 | - 3/4 | -10.3 | |
| O | INFOREX INC | 14- 36 | 13 5/8 | - 1/2 | -3.5 | |
| O | INFORMATION DISPLAYS | 1- 5 | 5/8 | - 1/8 | -16.6 | |
| O | INFORMATION INTL INC | 8- 25 | 11 1/2 | - 3/4 | -6.1 | |
| A | LUNGO ELECTRONICS | 4- 14 | 6 7/8 | + 1/4 | +3.7 | |
| O | MANAGEMENT ASSIST | 1- 1 | 1/2 | 0 | 0.0 | |
| A | MILGO ELECTRONICS | 15- 44 | 20 1/4 | -2 | -8.9 | |
| N | MOHAWK DATA SCI | 8- 27 | 7 5/8 | -1 | -11.5 | |
| O | ODEC COMPUTER SYST. | 3- 12 | 3 | - 1/4 | -7.6 | |
| U | OPTICAL SCANNING | 2- 16 | 3 1/4 | 0 | 0.0 | |
| O | PERTEC CORP | 5- 17 | 5 1/4 | -1 5/8 | -23.6 | |
| O | PHOTON | 3- 15 | 4 | - 3/4 | -15.7 | |
| A | POTTER INSTRUMENT | 6- 21 | 6 1/4 | - 3/4 | -10.7 | |
| O | PRECISION INST. | 2- 13 | 4 1/4 | -1 | -19.0 | |
| O | RECOGNITION EQUIP | 5- 15 | 5 1/2 | - 3/4 | -12.0 | |
| N | SANDERS ASSOCIATES | 11- 21 | 11 3/8 | + 1/8 | +1.1 | |
| O | SCAN DATA | 3- 13 | 2 7/8 | - 3/8 | -11.5 | |
| O | STORAGE TECHNOLOGY | 17- 39 | 20 | - 7/8 | -4.1 | |
| O | SYCOR INC | 7- 11 | 8 1/2 | -1 | -10.5 | |
| O | TALLY CORP. | 8- 15 | 10 | -2 1/8 | -17.5 | |
| N | TEKTRONIX INC | 34- 64 | 40 7/8 | + 7/8 | +2.1 | |
| N | TELEX | 4- 15 | 4 | - 1/8 | -3.0 | |
| O | WILTEK INC | 10- 26 | 15 1/4 | - 1/2 | -3.1 | |
| SUPPLIES & ACCESSORIES | | | | | | |
| O | BALTIMORE BUS FORMS | 5- 9 | 6 3/4 | 0 | 0.0 | |
| A | BARRY WRIGHT | 9- 14 | 8 5/8 | - 5/8 | -6.7 | |
| A | DATA DOCUMENTS | 17- 26 | 18 3/4 | -1 1/8 | -5.6 | |
| O | DUPLEX PRODUCTS INC | 8- 16 | 8 3/4 | - 1/4 | -2.7 | |
| N | ENNIS BUS. FORMS | 6- 10 | 6 3/8 | - 1/8 | -1.9 | |
| O | GRAHAM MAGNETICS | 15- 27 | 16 1/2 | - 1/4 | -1.4 | |
| O | GRAPHIC CONTROLS | 11- 15 | 11 3/8 | - 7/8 | -7.1 | |
| N | 3M COMPANY | 76- 88 | 79 3/4 | -2 3/4 | -3.3 | |
| O | MOORE CORP LTD | 42- 57 | 55 | - 1/8 | -0.2 | |
| N | NASHUA CORP | 48- 62 | 52 3/4 | -1 3/8 | -2.5 | |
| O | REYNOLDS & REYNOLD | 37- 77 | 47 5/8 | + 1/2 | +1.0 | |
| O | STANOARO REGISTER | 14- 20 | 17 3/4 | -2 | -10.1 | |

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